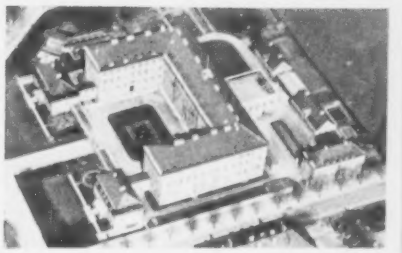
JUNE, 1958

# American Engineer

## THE EUROPEAN ENGINEER AND HIS EDUCATION

By Edward McCrensky,
Rockefeller Public Service Fellow



## *In this Issue:*

Air Pollution As a Civic Project by W. H. T. Holden, P. E., and H. E. Karig, P. E. . . . A Current Summary on Supporting Technical Personnel from the President's Committee on Scientists and Engineers by Karl O. Werwath, P. E., Committee Member and President, Milwaukee School of Engineering . . . The Corps of Engineers' Registration Program by Colonel Clayton A. Rust, USA

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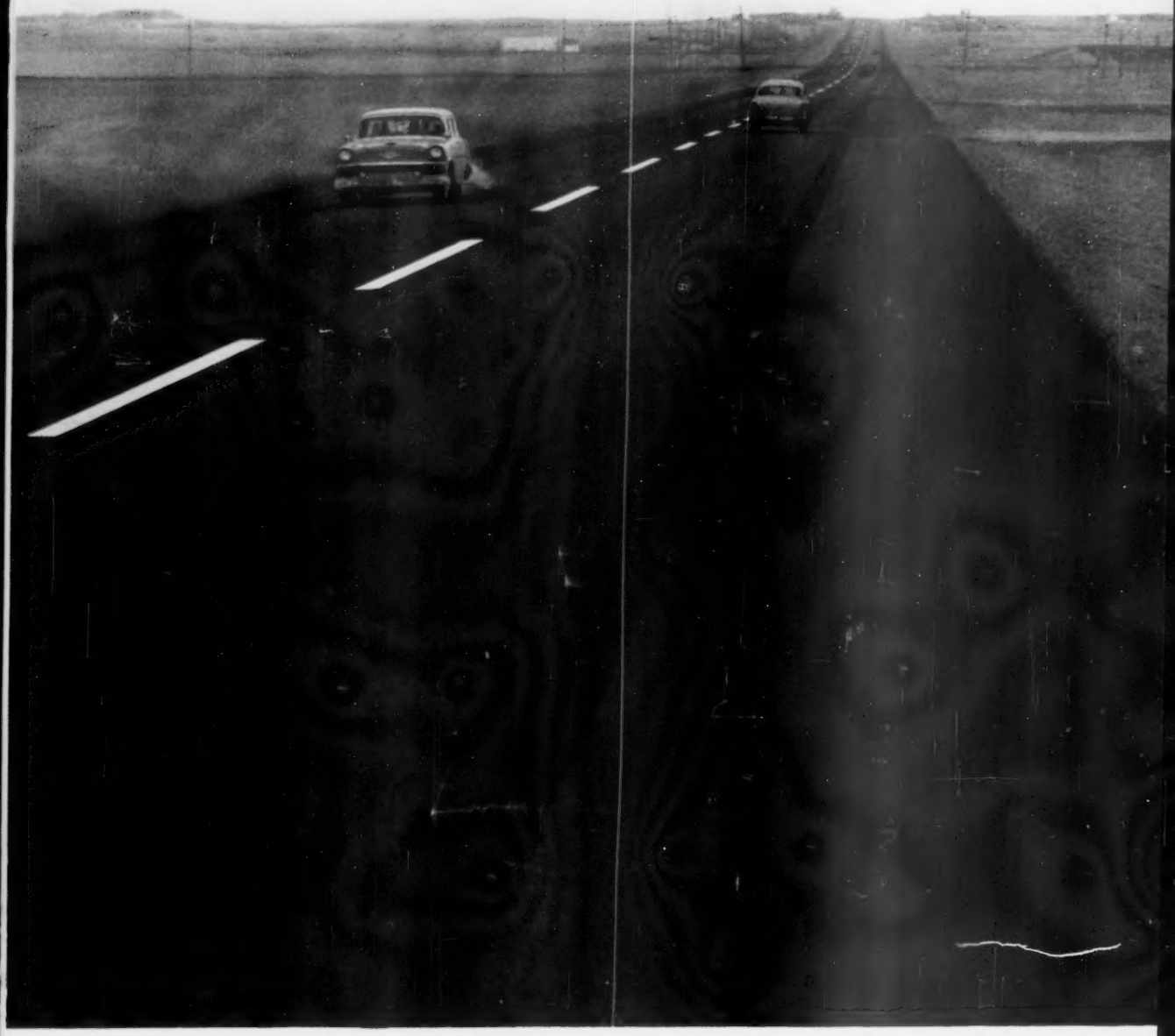

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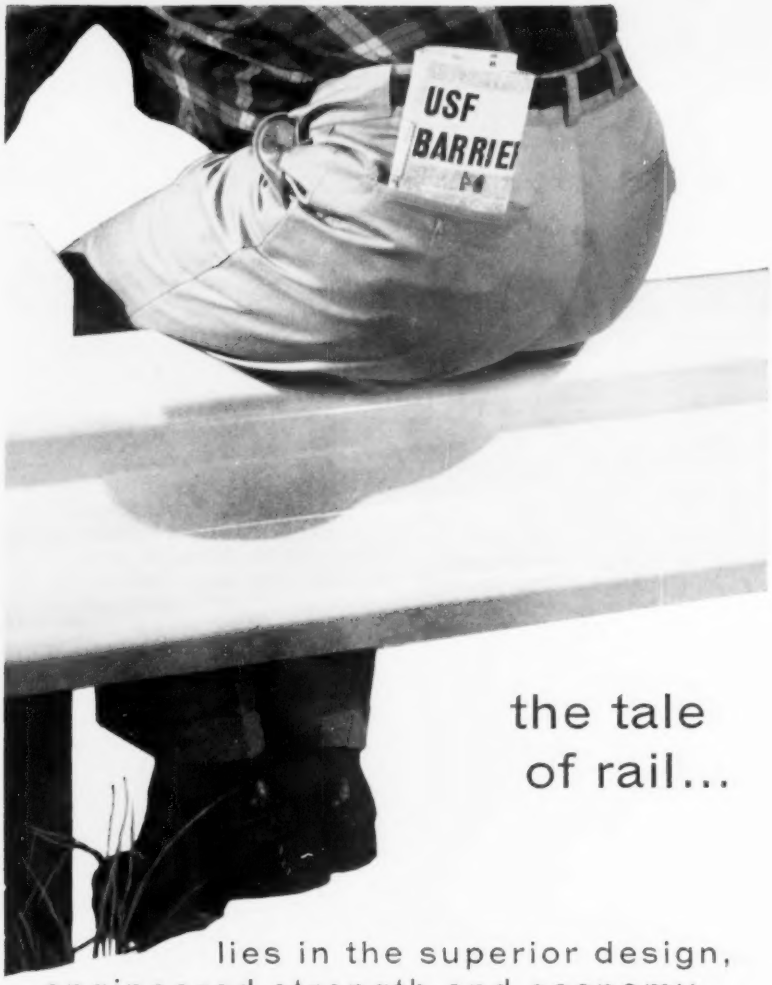

*(Circle 2 on Inside Back Cover)*

# Letters

### *Hershey Letter . . .*

Dear Editor:

In regard to the letters published in the AMERICAN ENGINEER, April, 1958, issue, from A. C. Kirkwood to General Hershey, and the reply from the latter, I feel an urgent necessity to discuss that reply and its implications.

It seems to me that General Hershey's letter has either missed, or artfully avoided, the direct issue as posed by Mr. Kirkwood. The point is that scientists, engineers, and like technical manpower, must be used in optimum positions in order to best serve the national interest, and that such should not be jeopardized by the arbitrary judgment of military interests.

Although General Hershey states: "To implement its (Section 1622.22) effectiveness, provision has been made for review by selected groups . . . especially well qualified to perform this service," there can be no doubt that such groups, as presently regulated, have not performed to the best interest of science and engineering; otherwise Mr. Kirkwood would not have had to write his letter. As a matter of fact, the General indicated that he, the director of the Selective Service System, would have classified Thomas Edison as a scientist! While Edison was probably our greatest inventor, he was certainly not a scientist. To me, this very item would seem to indicate that correct definition should be required rather than further admission of arbitrary judgment. Correct definition does not, by any means, supplant judgment, as the General fears, but only safeguards the standards of policies.

We are told in General Hershey's letter that every pressure group would like to obtain immunity on its own judgment, understandably. The American public as a whole has suddenly become cognizant of the fact that scientists and engineers are most essential to the national security and that they should be kept where they can produce most effectively. Unfortunately, the public as a whole has no lobby in Washington with which to apply pressure.

David S. Hyman, P. E.
Baltimore, Md.

### *Degrees . . .*

Dear Editor:

In your April issue (p. 48) Mr. Americo Lazzari refers to "an honorary Ph.D. degree in engineering or science."

I am writing to inform him and others that, around 1910, the practice of bestowing this degree *honoris causa* by cer-

*(Continued on page 47)*

# PROFESSIONAL NEWS IN CAPSULE FORM

*A Roundup of Late Events for Professional Engineers*

### *Standards Engineers Society Meeting Set*

The seventh annual meeting of the Standards Engineers Society will be held at the Benjamin Franklin Hotel, Philadelphia, Pa., September 22-24. The theme of the meeting will be, "Standardization—A Must for the Space Age."

To stimulate new ideas and to develop a top-quality program the annual meeting committee is sponsoring a technical paper contest in conjunction with the meeting. An award of $50 will be presented to the author of the winning paper and it will be published later in *Standards Engineering*, the official publication of the SES.

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### *William T. Alexander Elected ASEE President*

The American Society for Engineering Education has announced the election of William T. Alexander, dean of engineering at Northeastern University, Boston, to be its president for the year beginning in July, 1958.

Other elections of principal officers of the Society include: Clarence L. Eckel, dean of engineering at the University of Colorado, re-elected vice president in charge of regional activities in the western states; Elmer C. Easton, dean of engineering at Rutgers University, New Brunswick, New Jersey, named vice president in charge of activities of the Society's instructional divisions, and John Gammell, director of graduate training at the Allis-Chalmers Manufacturing Company, Milwaukee, re-elected treasurer of the Society for his third one-year term.

All of the new officers are NSPE members.

The elections, result of a national mail ballot of the Society, were announced by the Society's Executive Board during a meeting of the Southeastern Section of the ASEE at which the University of Miami was host to over 500 engineering educators.

"I know you expected me to work with you, Dad, but you can't even come close to the offers from other engineering companies."

### *Information Needed by 'Who's Who' Editors*

The eighth edition of *Who's Who in Engineering* is scheduled for publication at the end of this year. However, the editors report that to date twenty-five per cent of those listed in the previous editions have failed to reply to a mail canvass for updating purposes.

The mailing was made to the addresses given in the last volume. It has not been possible to locate many and others have undoubtedly postponed their replies for a more convenient time.

The editors point out that unless information is brought up to date by the individuals it will not be reprinted in the new edition. Therefore, it is urged that those listed in *Who's Who in Engineering* (seventh edition) and who have not done so, return their clipping promptly, or if they did not receive a clipping, to please contact the editors at 265 W. 14th Street, New York 11, N. Y.

△ △ △

### *Tau Beta Pi Elects Five for Fellowships*

Five young engineers have been elected by Tau Beta Pi, national engineering honor society, for graduate fellowship awards in 1958-59.

The five men and the schools from which they will graduate in June are: Lee E. Strawbridge, The Pennsylvania State University; Jimmy Lee Dodd, Mississippi State College; Peter Briggs, Rensselaer Polytechnic Institute; Frederick S. Hillier, Stanford University, and Lawrence C. Lynnworth, New York University.

These five awards by Tau Beta Pi's Fellowship Board bring the total to 147 fellowships granted since the program was inaugurated in 1929. Stipends for this group are $1,500 each for the nine-month academic year. All fellowships are awarded on the competitive basis of high scholarship, campus leadership and service, promise of future development in the engineering profession, and need for financial assistance in graduate work.

Paul H. Robbins, NSPE's executive director, is director of fellowships for Tau Beta Pi.

## Study Shows Need for Engineering Teachers

The heads of the nation's engineering colleges predict that the mounting requirements for engineers in the next decade will not be met unless American education is prepared to pay the price of attracting top talent into engineering teaching careers.

By 1967, American engineering colleges will need 7,000 more engineering teachers, to bring the total of their engineering faculties to 16,000.

Their salaries should average $12,500 in 1967 dollars, 105 per cent more than today's average.

The total salary bill should be $200 million, an increase of 233 per cent.

These are the conclusions of a two-year study of what its authors call "the crisis in technological education," sponsored by a special Committee on Development of Engineering Faculties of the American Society for Engineering Education.

The conclusions are based on estimates by the heads of the nation's engineering colleges: by 1966-67 undergraduate engineering enrollment will be up sixty-six per cent and graduate enrollment will have doubled. Already, say the engineering deans, across-the-board salary increases averaging at least forty per cent are needed to make academic jobs competitive in total satisfactions with non-teaching opportunities. If general salary levels continue to rise, more increases will be needed to keep pace.

The findings, said Dr. Harold L. Hazen, dean of the Graduate School at the Massachusetts Institute of Technology and chairman of ASEE's Committee, present an urgent challenge:

Can American education pay the price necessary to attract top talent into engineering teaching careers?

New facilities are important; more efficient use of present facilities and teachers will help; helping students finance their education is also important. "But," Dean Hazen said, "these things are meaningless if students in the future find as teachers only what is left after the cream of the ability has been skimmed.

"The central problem, controlling in an absolute sense, is adequate financing of the facilities," he said.

The study on which the ASEE Committee bases its conclusions was made by the Bureau of Business and Economic Research at Northeastern University, Boston, under the direction of Dr. William H. Miernyk, now visiting professor of economics at M.I.T., and Dr. Morris A. Horowitz, associate professor of economics at Northeastern.

## Modern Engineer's Role Expanded Considerably

Modern engineering problems are such that the engineer must now also be a diplomat, salesman, economist and long-range planner, the American Society of Civil Engineers was told at its recent convention in Chicago, Ill.

On the convention program to present a report on Chicago's Calumet-Sag Navigation Project, Colonel John B. W. Corey, Jr., a U. S. Army engineer attached to the Army Engineering District of Chicago, told his audience:

"The problems encountered in this project are typical of those encountered in modern engineering in which the trend seems to minimize technical aspects and place greater emphasis on non-technical considerations which must be resolved to satisfy various interests.

"The role of the engineer has been expanded and now he must be a diplomat, salesman, economist and long-range planner.

"These additional responsibilities must be assumed by engineers in order that technical aspects are not disregarded and, most importantly, who more logically should undertake them?"


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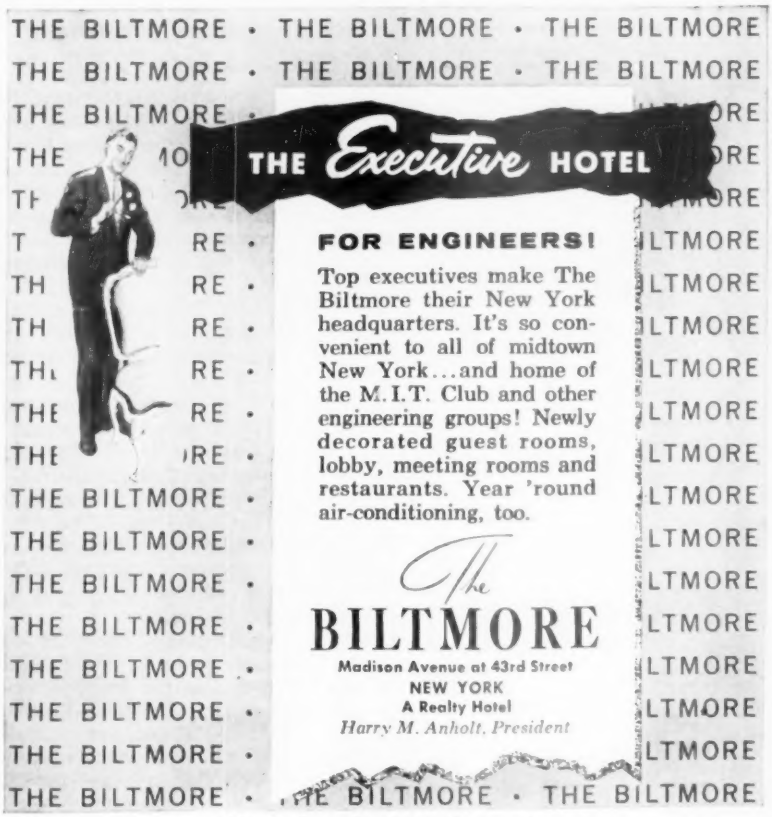
*(Circle 4 on Inside Back Cover)*

## Dr. Ragazzini Named NYU Engineering Dean

Dr. John R. Ragazzini, chairman of the Electrical Engineering Department at Columbia University's School of Engineering, has been named dean of New York University's College of Engineering. The appointment was announced by President Carroll V. Newsom of NYU.

Dr. Ragazzini will assume his new duties on July 1. Dean Emeritus Thorndike Saville held the post from 1935 to 1957. Professor Norman N. Barish has been serving as acting dean during the current academic year and will continue to do so through June 30.

"Dr. Ragazzini's broad experience in both education and research will add considerable strength to our expanding engineering programs," NYU's Executive Vice President John E. Ivey, Jr., said.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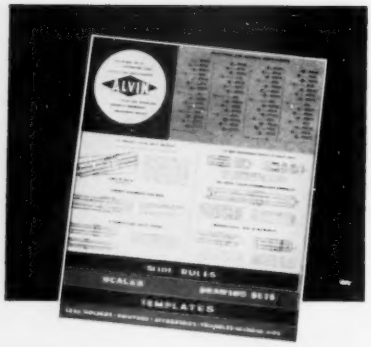


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## *Michael Baker, Jr. to Get Penn State Award*

Pennsylvania State University will give one of its Distinguished Alumnus Awards on June 14 to Michael Baker, Jr., a 1936 graduate who has built up one of the largest consulting engineering organizations in the world.

Mr. Baker, who was graduated at the head of his class with a civil engineering degree, is the founder and president of Michael Baker, Jr., Inc., world-wide engineering firm with headquarters in Rochester, Pennsylvania. He is a member of NSPE.

Today the firm bills $10 million annually and has carried out projects in forty-four states and five foreign countries. Michael Baker, Jr., Inc., has branch offices in Jackson, Miss.; Washington, D. C.; College Park, Md.; Philadelphia and Harrisburg, Pa.; Columbus, Ohio, and Charleston, W. Va.

Penn State gives the Distinguished Alumnus Awards to recognize achievements of outstanding alumni. It is made annually to former students of Penn State who, through their personal lives, professional achievements and community service, exemplify the objectives of the university.

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## *ASTM Annual Meeting Scheduled June 22-27*

The sixty-first annual meeting of the American Society for Testing Materials, June 22-27, in Boston, Mass., will be the largest ever held in the history of this national technical society. In addition to eight technical sessions, eleven symposiums and five luncheons, more than 800 committee meetings will be held.

Recognizing the need for authentic information in this technical age, several symposiums will be held dealing directly with basic research and the furtherance of science. Included will be symposiums on materials research frontiers, basic mechanics of fatigue, and radiation effects on materials.

Of particular interest to industry in the New England area, will be a session on textiles and symposiums on paper and paper products, and radioactivity in industrial water and industrial waste water.

The national highway program will be adequately covered from the technical and engineering point of view through sessions on road and paving materials, soils, cement, and concrete, and symposiums on the effect of water on bituminous paving materials, and application of soil testing in highway design and construction.

## *ASEE Annual Meeting Slated for June 16-20*

The American Society for Engineering Education will hold its annual national meeting from June 16 to 20 on the Berkeley campus of the University of California.

During that week more than 1000 engineers and educators will gather to present and discuss recent progress toward increasing the effectiveness of engineering and applied science instruction in the nation's schools and colleges.

Four general sessions of the Society will cover such topics as engineering accrediting procedures; research and the engineering college; improved use of facilities and staff; a survey of nuclear manpower; and the development of engineering faculties.

Conferences of the Engineering College Administrative Council and the Engineering College Research Council will also be held during the five-day gathering. Discussion by these groups will include such important questions as secondary education for future engineers; the current and future supply and demand for engineers and scientists; and stability in engineering college research programs.

In addition, the meeting will offer a wide range of special conferences devoted to the improvement of educational techniques in the various engineering fields and in the humanities and social sciences areas as they apply to engineering and science education.

Persons interested in attending the meeting may address Professor E. P. DeGarmo, Division of Industrial Engineering, University of California, Berkeley 4, Calif., for full information. Registered attendance by nonmembers is cordially invited; the registration fee will be $4.

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## *Women Engineers to Meet in Pittsburgh*

The 1958 national convention of the Society of Women Engineers will be held in Pittsburgh, Pa., at the Hotel Penn-Sheraton June 6-8.

With the theme "Coal and Steel," women engineers throughout the United States will hear speakers in these industries and tour Jones and Laughlin Steel Company, the Maude Mine Company, and the H. J. Heinz plant.

The Society of Women Engineers is a professional organization of graduate women engineers in the United States and Europe. At the annual banquet the SWE award to an outstanding woman engineer will be presented.

## Science Foundation Announces 85 In-Service Institutes for Teachers

Approximately 3,000 high-school teachers of science and mathematics will benefit during the academic year 1958-59 from eighty-five in-service teacher-training institutes conducted by United States colleges and universities.

Awards of grants totaling $607,250 to support these institutes were announced recently by Alan T. Waterman, director of the National Science Foundation. Travel expenses, tuition, and fees for each participant will be covered by the Foundation grant. Participants in each institute will be selected from high-school teachers within a radius of some fifty miles of the host institution.

In-Service Institutes for secondary-school teachers of science and mathematics will offer work in the subject matter of science and mathematics especially designed for these teachers. Institute meetings will be held outside regularly scheduled schools hours—e.g., evenings, Saturdays, or late afternoons—so that teachers may attend while still teaching full time in their schools. A typical institute might meet once a week for two hours for the full academic year of about thirty weeks. Half of these meetings might, for example, be devoted to laboratory work.

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## Many Field Trips Scheduled on ASCE Portland Meeting Program

One hundred thirty papers, many of them of considerable public interest, are on the agenda for the convention of the American Society of Civil Engineers in Portland, Ore., June 23-27.

In addition to the technical papers, which cover all phases of civil engineering interest, several field trips are being planned. Most of the program for the second day, Tuesday, is devoted to field trips.

These trips include a visitation to lumber industry processing plants, sponsored by the Structural Division; a tour of the Swift Creek Dam, sponsored by the Soil Mechanics & Foundations, Construction and Power Divisions.

Also a trip to the R. H. Baldock Freeway, sponsored by the Hydraulics Division; a tour of the Bonneville Hydraulics Laboratory, sponsored by the Hydraulics Division, and a visit to the City of Salem and the American Pipe and Construction Company's Pipe Plant, sponsored by the Pipeline Division.

On Friday, an all-day field trip to the Dalles Dam will be sponsored by the Corps of Engineers, Portland District.

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## Joseph M. Pettit to Become Dean Of Engineering at Stanford Univ.

Joseph M. Pettit, professor of electrical engineering and 1952 winner of the Institute of Radio Engineers achievement award, will become dean of the Stanford University School of Engineering next September 1, President Wallace Sterling has announced.

He will replace University Provost Frederick E. Terman, who has held the dual position since 1955. Dr. Terman will devote his full time to administrative duties as the second ranking academic officer of the university.

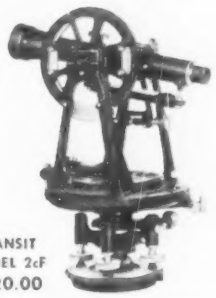
## Engineering Management Manpower Meeting Held by Boston University

In an effort to orient engineering students to managerial responsibilities, Boston University's College of Industrial Technology recently sponsored an engineering management manpower roundtable with participants from Massachusetts industry.

Speakers for the manpower roundtable, designed to make students aware of career managerial opportunities in the engineering fields, included: Ellsworth D. Baker of Palmer, Mass., engineering consultant, Barnes Textile Co.; Russell S. Rockafellow of Sudbury, Mass., director of industrial engineering, Raytheon Manufacturing Co., and Dr. Frank W. Maurer of Newton, Mass., assistant to the vice president, engineering, Arthur D. Little Co.

Alerting engineering students to the possibilities in engineering management and design, management and production and management consulting, the panelists emphasized that young, inexperienced engineering employees must be considered in terms of the profit potential they can provide their corporations. Stressing the importance of knowing the management team under which the engineer is assigned, senior executives agreed that young potential management talent should be judged from the quality of work and interest in doing more than weekly assigned tasks.

"Today's managers need to be as concerned with human engineering as with meeting assignment deadlines. Executives must be conversant with how to improve engineering through machine production and how to determine improvement of engineering services through greater usefulness of the human product," Mr. Baker stated.

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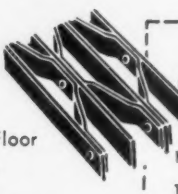

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*(Circle 9 on Inside Back Cover)*

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-EIGHT NUMBER 6

***A Comprehensive Study by Edward McCrensky As a Rockefeller Public Service Fellow***

Engineering students at Aberdeen University, Scotland, take part in an experiment in connection with waves of water. Note student in kilts.

# The European Engineer and His Education

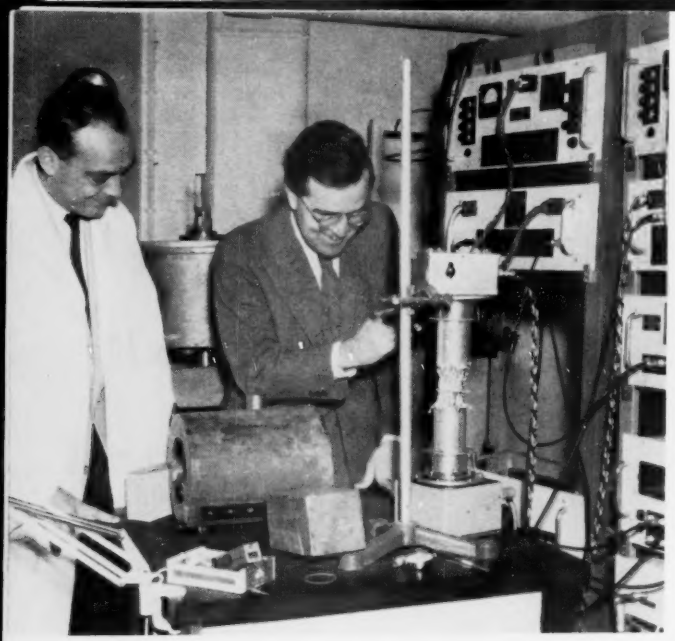
To know the experiences of other countries is to know America better. The growth, care, and feeding of engineers is today a highly publicized subject in all countries. As the public forum is open to sensation seekers, the half informed, the axe-grinders, as well as, to the well-informed; conflicting and confusing notions are regularly circulated through our newspapers and other information media on educational comparisons of engineering education in the USA as compared with Europe.

Significant questions such as the following are frequently raised but inadequately answered: Are engineers given a better education in Europe than in the United States? How many professional engineers are annually produced abroad? What are professional status and prestige of a professional engineer abroad? What are their career expectations and goals? Does the national educational system train sufficient engineers to meet national requirement for economic competition through the world?

The author, as a Rockefeller Public Service Fellow, has recently returned from eight months intensive study of scientists and engineers in Europe. This article summarizes some of his findings on the educational, social, and economic aspects of professional engineers in Europe today.

## Availability of Higher Education

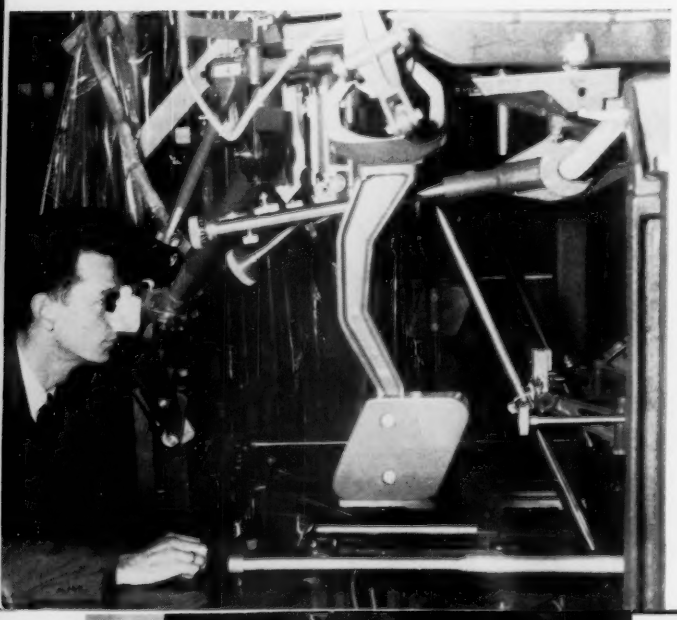
Basic cultural differences must be recognized between the USA, Great Britain, and the countries of Western Europe in the system and goals of higher education. In affording an opportunity for university education, European public educational systems drastically "select out" students by national examinations starting, for example, in Germany at age ten and in Great Britain at age eleven.



Prof. Raymond K. Sheline (Florida State University, Tallahassee, Fla.) 1955-56 Fulbright research scholar in the field of physical chemistry at the University of Copenhagen, Institute for Theoretical Physics. Dr. Sheline was photographed at the Institute where he is discussing his work with Dr. Aage Bohr, physicist son of Prof. Niels Bohr.

Elimination of pupils continues subsequently at several stages in the secondary education program preparing for university training. The culmination of this screening out process is the matriculation examination given in all the countries of Western Europe and Great Britain. All but around five per cent of the total student population in a particular age group have been dropped out of consideration by this time. Therefore, only about one child in twenty in Great Britain and Europe is permitted to receive the prerequisite secondary school training for a university education. In the USA by contrast, college preparation is available to all who can perform the work. At least one out of every eight American students in the nation's graduating classes will enter college each year.

In Europe, the limited opportunity for obtaining a university education enhances the prestige of those fortunate to qualify. The matriculation certificate will meet the entrance requirement for most European and British universities. Unlike Europe there are no national examination criteria in the United States for assessment of the quality of university preparation achieved. The European student who receives his matriculation certificate has had the equivalent in education of an American student with two years of college. This is reflected in the European universities' requirement that USA applicants must have a high school diploma and the equivalent of two years of college for admission. Conversely, many American universities admit the matriculation certificate holders from European secondary school to junior year status.



### Designation of University-Trained Engineers

Most countries of Western Europe have used traditionally a clear-cut and uniformly applied nomenclature to designate university-trained engineers. The professional status of the technical university or hochschule graduate engineer is firmly established and very diligently safeguarded. There is a wide gap in status between the university engineer and the engineer who is a graduate of a technical college below the university level or an engineer who has acquired this designation principally by "on the job" experience. This difference is diligently safeguarded by the members of the profession and their representative organization. In the Scandinavian countries, the generic term "Civilingenior" always denotes graduation from a technical university irrespective of the occupation or specialty. In the Netherlands the prefix "Ir." before the name denotes unmistakably graduation from the technical university at Delft. In Switzerland and Germany, "Diplom-Ingenieur" precisely identifies technical university graduate engineers and has both legal and economic significance. In Great Britain, only members of the various institutions of engineering are accredited as professional engineers.

A MAJOR factor in the prestige of the university graduate engineers in Continental Europe is the great public respect for the technical university tradition which had its roots in Germany. In Germany, for example, the technische hochschule, which literally translated means "technical high school," is in fact a technical university of the highest standards and reputation, comparable to our best institutes of technology. The independent technical university is found in many countries of Western Europe.

### Education of Engineers in Great Britain

In Great Britain, three principal routes are available for obtaining an engineering education:

1. By a full-time university course lasting three or four years and leading to a degree in engineering or an allied branch of science. The candidate normally obtains admission to a university engineering course by satisfactorily completing the examinations in scientific or mathematical subjects given in the General Certificate of Education examination. One problem in the supply of potential engineers is that a student's chances of entry to a university engineering course are negligible if his preparatory training has been on the "arts" side. The main exception is Imperial College of London University which has a scheme for re-directing good "arts" men into science and technology.

James Dowdy, 1955-56 American Fulbright student, studying at the International Training Center for Aerial Survey in Delft.

The Remington Rand UNIVAC Center at Frankfurt, Germany. Mr. McCrensky is at left, and Charles Elliott, Remington Rand, Great Britain, is on the right.

2. By a "sandwich" course consisting usually of periods of full-time study at a technical college alternating with industrial employment. On successful completion of this course a higher national diploma in engineering is awarded.

3. By a part-time "earn-while-you-learn" program at a technical college leading to an ordinary and then to a higher national certificate. These national certificates in engineering and allied subjects are awarded jointly by the Ministry of Education and the professional institution concerned, for example, the Institution of Mechanical Engineers for mechanical engineers. The ordinary certificate is awarded after a three-year course, the higher after an advanced course. The technical colleges are managed and financed by local education authorities under the regulations of the Ministry of Education. The majority of the students are taking studies related to their employment on a part-time basis. Some institutions can attract staff of some academic standing while others have great difficulty in attracting superior teachers due to long hours of day and evening teaching and lack of adequate recognition and prestige.

Before products of any of the three systems are accepted as professionally qualified engineers they must be given corporate membership by an appropriate professional society or institution. For example, the Institution of Mechanical Engineers and the Institution of Electrical Engineers requirements for corporate membership are an approved course of two years' practical training in addition to a university degree or an equivalent diploma of a senior technical college.

### Education of Engineers in Germany

Germany has had a profound historical influence upon the scope and content of the higher education of engineers in Europe. The technical university or institute of technology in Germany, an autonomous institution of university level for training engineers, has spread from Germany to Switzerland, Sweden, Norway, The Netherlands, and most recently to France.

Two basic principles in educational philosophy merge in the ideology of the "technische hochschule." The first is that during the first four semesters a prime order of importance is given to basic scientific knowledge without any technological application. During this two-year period, mathematics, physics, and mechanical theory are the core subjects.

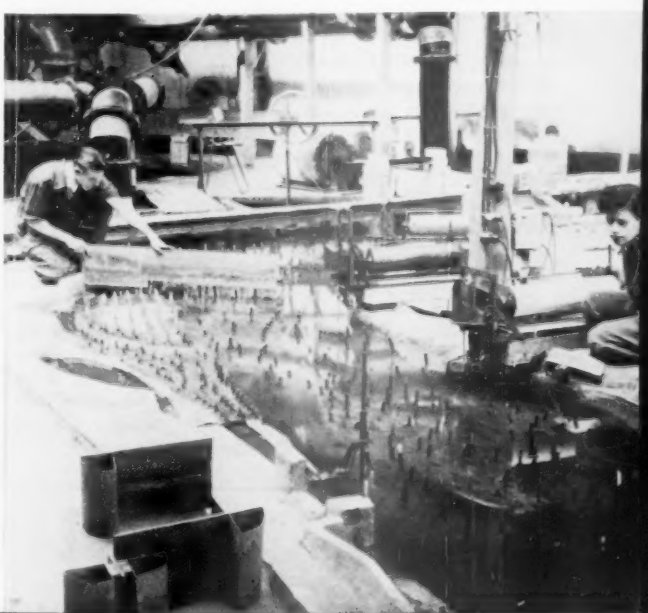
The second principle is the completion by all students of a prescribed period of practical training in an industrial environment before graduation. In Germany, students at a technische hochschule or institute of technology must complete six months of the practical experience requirement before the end of the first four semesters and the final six months before the end of the last four semesters. During the last four semesters, students obtain a specialized training in a particular branch of engineering.

### Supply of German Engineers

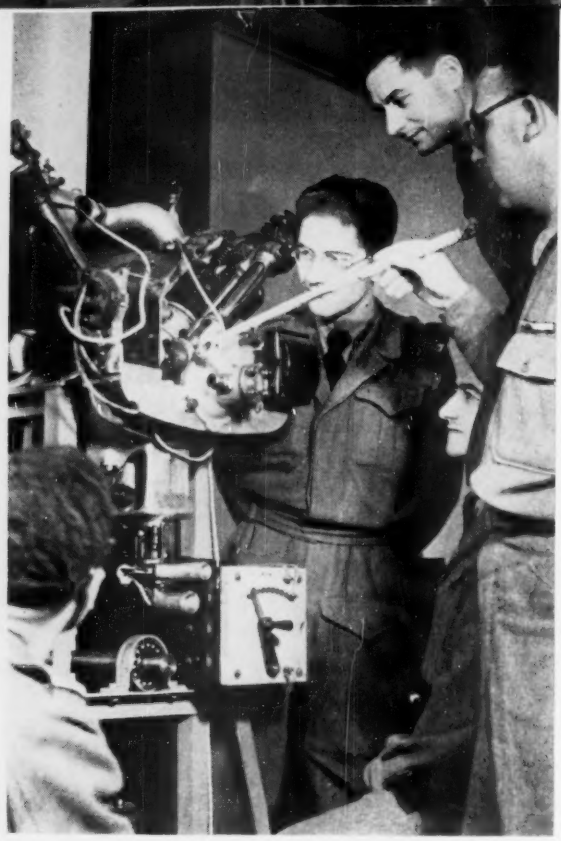
The supply of professional engineers comes from two principal sources. The first is the institutes of technology. Such graduates may be identified by the abbreviation of diplom-ingenieur, "Dipl.-Ir.," which always appears with their name in official activities. Trained in science as well as applied engineering, they have the highest prestige among German engineers. This status also stems from the reputation of the institute of technology. These institutions owe their world stature, among other factors, to three major policies which they all follow. These are:

1. Employment of professors of highest professional capacity who are typically also consultants to industry.
2. Setting of a high standard for selection of students, who, once admitted to a particular institute of technology, may transfer to another institute for a later phase of their training.
3. Establishment of laboratories where significant research is undertaken in which students participate.

For admission as a regular student, the "abitur," or final examination of a secondary school which entitles the



Two students of the Delft Institute of Technology working at a scale model of the so-called "Delta Plan." This government-sponsored project aims at closing the wide sea arms on the southwestern coast of The Netherlands with the two-fold purpose of strengthening the sea defense and of securing a further increase in land space.



The Polytechnical school, which had produced the "ingeneers" technicians and officers of France since Napoleon's time, has now been attached to the Ministry of War. Here, a group of future technicians experiment with the various parts which make up an aeroplane motor.

holder to matriculate at a university, must be successfully passed. At Aachen, all students who have completed this matriculation examination may enter within the accommodation available, irrespective of whether main stress at the secondary school was on natural science or modern or classical languages. As many more candidates apply for admission to each institute of technology than can be admitted, only the most promising are accepted. The method of instruction is for the professors to give lectures in their subjects to very large classes, frequently as many as 500 students, in a general subject such as physics or mathematics. In addition, the students meet in small groups of twenty or thirty with instructors. During these sessions, they do practical exercises in each subject. They must pass an examination at the end of the two years of study. If successful, they continue their studies for four more semesters and eventually must pass a final comprehensive examination to receive their diploma of engineering or science. As explained earlier a full year of practical experience must also have been obtained prior to graduation.

***The Photos on the Cover: Clockwise are shown The Institute of Technology, Stockholm, Sweden; The Rockefeller Institution, Copenhagen, Denmark; Physikalisches Institut, Heidelberg, Germany; Technical University, Delft, The Netherlands, and Trinity College Main Court, Cambridge University, Cambridge, England.***

Although the course of study is theoretically four years in duration, the average time for most students is five to six years before passing the final examination. Studies at German universities are concluded by academic and state examinations. The former entitle the students to diplomas or doctor's degrees. State examinations qualify students for a civil service career or for state-controlled professions. Relatively little emphasis is placed on study of humanities or social sciences. However, modern language courses are provided. In addition, the faculties of the humanities offer in the "studium generale" a choice of lecture courses or individual lectures on a broad range of topics. A selected set of such lectures is usually compulsory for the first year.

A second major source of engineers in Germany is from the seventy-six technical colleges or "ingenieurschulen." Graduates of these technical colleges may legally call themselves engineers and use the term "Ir." with their name.

Principal differences between the technical colleges and the institutes of technology program previously discussed are: (1) At the technical college the curriculum is specialized, established to supply engineers for a certain specialty such as aeronautical engineering or textile engineering. (2) The minimum duration of the program is three years, as compared to four at the institute of technology. (3) Prior to entrance to a technical college, candidates must have had at least two years of practical experience in industry. Graduates of the technical college are a bulwark of industry. Current policy in Germany is to increase the supply from this source by as much as fifty per cent.

### Sweden, Norway and Denmark

In Sweden, three different classes of engineers are formally recognized. The "Civilingeniors" have the highest status. They are graduates of the Royal Institute of Technology or the Chalmers Institute of Technology which are the only university level engineering institutions. Next in prestige are the engineers who graduate from the technical colleges and are known as "Gymnasieingenjorer."

*(Continued on page 41)*

## *About the Author . . .*

Mr. McCrensky

Edward McCrensky is a native of Boston, Massachusetts, where he graduated from Boston College in 1933. He has a Master's Degree in Education from Boston Teachers College and has done graduate work in the Harvard School of Education. He has been in the Federal Service since 1941, primarily engaged in Personnel Administration and is presently director, Civilian Personnel and Services Division, Office of Naval Research, Washington, D. C.

He was awarded a Rockefeller Public Service Award, 1958-1959 for study of scientific manpower in Great Britain and Europe which permitted him to spend eight months in Great Britain and countries of Western Europe. This award is considered as one of the outstanding awards available to senior civil service officials and is given by Princeton University. Funds are made available by John D. Rockefeller III.

Mr. McCrensky has been a member of the faculty of the College of General Studies, George Washington University since 1950.

He is the author of a book, *Scientific Manpower in Europe*, which is being published by Pergamon Press Ltd. of London and New York. The book will be released in Europe and the United States in June.

# FROM WASHINGTON

BY
MILTON F. LUNCH,
*N.S.P.E.'s Legislative Counsel*

## OF MOONLIGHT . . . SPACE . . . DEFENSE . . .

"MOONLIGHTING" is a colloquial term often heard in Washington, although not confined to the Capital environs. For the uninitiated in such jargon, it identifies in general the practice of a full-time employee engaging in similar or related work on his own time, such as evenings, weekends, holidays, paid leave, etc. The practice is sometimes called "sundowning." No matter its title, the practice is and always has been a controversial one. The subject flares to life periodically among various groups, including the professions, and was, in fact, the topic of a special study and report by the NSPE Engineer-in-Government Subcommittee several years ago.

It is back in the news again by virtue of a bill introduced by Senator George D. Aiken of Vermont "to

Senator George D. Aiken of Vermont

improve the efficiency of the Government by regulating the outside employment by officers and employees of the departments and agencies of the Government. . . ." The Aiken measure would establish as general Government policy the undesirability of outside activities related to official duties or which might tend to impair the mental or physical capacity of the employee to render proper and efficient service to the Government. The regulatory portion of the bill would require agency approval before an employee would be permitted to engage in outside activities. Penalties, including furlough without pay and dismissal, would be authorized for violations.

At recent hearings on his bill, Senator Aiken said that it was inspired by complaints from a mapmaking concern in Vermont that much of the Government's mapmaking work was being done by "fly-by-night" companies located in the Washington area. It was charged that the local companies could undercut those in the mapmaking business by hiring Government employees in their spare time to do the work. An investigation by the General Accounting Office reported that 125 Government employees were found to have worked for local mapmaking companies during a three year period on a part-time or subcontract basis, and that thirty-four of the 125 employees had supervisory Government positions.

The witnesses for the Government agencies opposed the enactment of the Aiken bill, stating uniformly that they already have authority to prevent abuses. The type of authority referred to by the witnesses was summarized in the NSPE report referred to previously. There are a large number of laws which make it a crime for a Government employee to act for outside interests to the detriment of the Government. Also, the report cites the agency policies which govern outside activities of the employees. The basic theme of these policies is that an employee may not engage in outside work which conflicts with his primary responsibility to the agency, or which might cause embarrassment to it.

Even should the Aiken bill become law it would not resolve the basic conflict in the problem because it would not prohibit competitive activities on the part of those who do their particular work as a sideline, relying upon their full-time job for their basic income. The Vermont Senator says that he does not wish to prohibit outside employment so long as it does not interfere with regular Government employment, "and so long as it is ethical employment."

In that phrase is the rub; where does honest and honorable extra work for the man who wants to get ahead, improve his economic position or make a start toward his own practice end, and unfair, undercutting and unethical competition begin?

### CENTRALIZED R&D FARES WELL

Even the most persistent and vocal critics of President Eisenhower on the "leadership" issue must acknowledge that he has made good his promise to do battle without letup for his defense reorganization plan. Clearly, the President's fight has paid dividends, but the plan is far from out of the woods.

The House Armed Services Committee has reported a clean bill (H.R. 12541) which gives the President much, but not all, of his original request. The Senate

Committee is still to be heard from, but the indications are that their report will be in general accord with the House Committee report. The President has indicated acceptance of the House Committee bill with two exceptions, on which a floor fight is indicated: (1) lift the restrictions on the Defense Secretary's power to transfer service functions, (2) strike out a section recognizing the autonomy of the services by declaring they are "separately organized" and shall function under the control of the Defense Secretary "exercised through the respective secretaries of such departments."

Of major interest to the engineering and scientific professions is the fact the clean bill approves the strong authority asked for the centralization of research and development. In his public utterances during the hearings the President made a powerful case for this portion of the bill. He pointed out to an assemblage of newspaper editors, for example, that more than $5 billion a year is being spent for military research and development programs, dispersed among the services. This invites costly rivalries, he said, and the centralization authority in the bill "will surely cut costs markedly and improve efficiency." This is the kind of argument the Congressmen can understand and appreciate.

The President told the editors that the supervision of the technical area will be under the direction of a top civilian who will be a national leader in science and technology. There are some who feel that the President's plan does not go far enough in the consolidation of technological activities. Senator Mike Mansfield of Montana thinks that research and development should be taken away from the Defense Department completely. "It is my feeling that in order to do away with the rivalry—but not the competition—between the services, that the proposed office of research and development should be set up as an independent civilian agency with close liaison with the Department of Defense, with a chairman having direct access to the President, and with a commission answerable to Congress."

Much of the steam was taken out of the opposition when the President told Congressional leaders that he was not trying to seize the power of the purse with regard to military appropriations, and would be satisfied with authority for the Secretary of Defense to shift ten per cent of the military funds from one service or project to another, when needed. Such a limitation written into the bill will apparently satisfy such critics as Senator Styles Bridges of New Hampshire who heads the Senate Republican Policy Committee. Senator Bridges had insisted that the power to transfer funds must be restricted. Strong support for the reorganization came from Chairman Clarence Cannon of the House Appropriations Committee. In a 50-minute House speech which drew strong applause from both parties, Rep. Cannon called the plan "a reasonable, sensible, long-delayed, much-needed revision," and urged "no compromise" on it by Congress.

◄ Senator Styles Bridges of New Hampshire

Roy W. Johnson ► Director, Advanced Research Projects Agency

## SPACE AGENCY HITS SNAGS

The National Aeronautics and Space Agency plan has run into rough weather after a smooth start that foretold of easy adoption with minor revisions. Now there is much controversy over some of the basic points in the plan. Among these are moves by the military to protect its role in space exploration and development. Army, Navy and Air Force spokesmen have advised the Senate Space Committee that the proposal for the civilian agency might threaten control of space projects related to defense. The service witnesses said that military aspects of space research should continue to have funding and direction from the Department of Defense. Roy W. Johnson, head of the Pentagon's three-month-old Advanced Research Projects Agency, told the Senators he was given only twenty-four hours to read the bill and submit suggestions and was not invited to any conferences on it. The solons have a real dilemma on the military *v.* civilian control point. There is almost universal support for civilian control for space research. But there is also a strong feeling that such a vital aspect of defense potential should not be taken away from the military. The obvious, but difficult, solution is to try to spell out jurisdiction between that which is civilian and that which is primarily of a military nature. Many feel that this will be virtually impossible to accomplish. Thus, the result might be duplicate programs in a highly expensive field—a situation which the military reorganization bill is trying to eliminate in research and development work.

*A Smoggy Day In Old L. A.*

*Clear, Windy Day— No Smog*

# Air Pollution As a Civic Project

By
**W. H. T. HOLDEN, P. E., and**
**H. E. KARIG, P. E.**
*Members, California SPE*

In the October, 1952, issue of the AMERICAN ENGINEER, an article entitled, "Making Our Air Cleaner," pointed out that this was a public service activity for professional engineers. It has been an item in the public service program of the Pasadena Chapter since that time, and both the Chapter and the State Society are attempting to aid the campaign for cleaner air by special committees on air pollution. Similar committees are found in other professional groups, notably in the Los Angeles County Medical Association and in the Bar Association.

Unlike the "smoke nuisance" of many other cities, Los Angeles smog is not a smoke and sulfur problem from the use of high sulfur and high volatile matter coal fuels. Coal consumption here is negligible and thermal sources of all sizes, from the domestic heater used in the cooler months to the large furnaces supplying heat to the boilers of steam operated electric generating stations, are fired on oil or gas. Carbon smoke is present, but in a small amount and in a finely divided state. The familiar soot particle of the East is unknown, and Los Angeles smog is not a laundry problem. It is a whitish or brown haze, that produces eye irritation, obscures visibility, and may at times be smelled and tasted. It damages plants, and medical

men suspect it of causing respiratory troubles of varying degrees.

The smell and taste of smog are somewhat sulfurous, and this, coupled to experience elsewhere led to an initial attack on emissions of sulfur oxides. While these are still a problem, especially if a number of large thermal sources using fuel oil having 1 to 1.5 per cent sulfur content are built, sulfur emissions were greatly reduced in the earlier stages of the air pollution control program. This program was in the hands of the Air Pollution Control District, created under an Act of the 1947 Legislature. Sulfur reduction did not lead to smog reduction, but the efforts to suppress sulfur oxide emissions are a necessary and continuing part of the activities of the Air Pollution Control District.

About 1950, research work by Dr. A. J. Haagen-Smit, a biochemist at the California Institute of Technology, established the active agent in Los Angeles smog as an unstable product resulting from a reaction between hydrocarbons and oxidation states of these substances, and nitrogen dioxide. Ozone apparently also is involved. The unstable compound, still not fully identified, breaks down into ozone and aldehydes or ketones. Its effects may be enhanced by condensation on finely divided particulate matter. While this work was questioned initially, it has been abundantly confirmed by several independent laboratories.

WHILE industry as a whole has made substantial progress in lowering smog from industrial sources, there is still some unfinished business, and at present a vigorous program is underway to eliminate sulfur and nitrogen oxides, organic compounds and particulate matter from the stacks of steam driven electric power generating stations. This problem is only of moderate proportions today, but would be serious if the anticipated expansion of these stations were carried out without adequate controls.

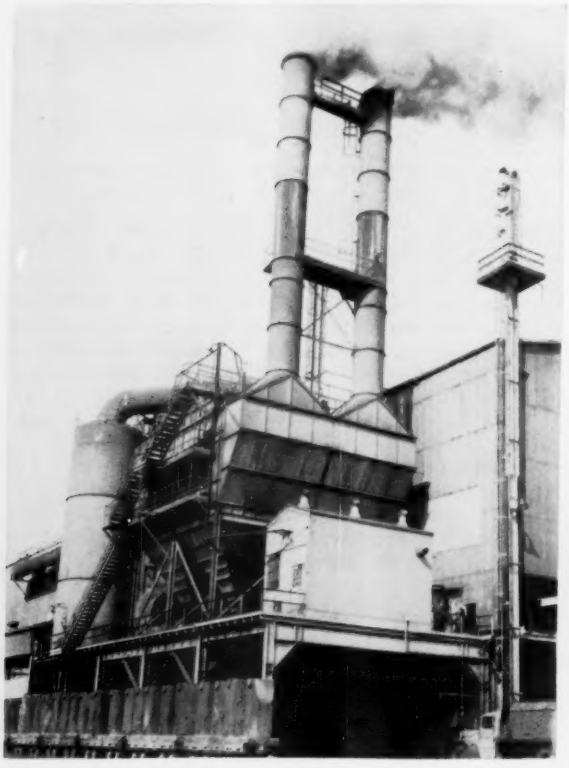
While more drastic control of industrial sources and elimination of burning have reduced smog, it is still a problem. The reason for this is obvious. The continued growth in population and the lack of any useful transit system has resulted in a rising air pollution problem as far as the automotive contribution is concerned. Automotive air pollution is now rising at such a rate that it threatens to wipe out the gains made by industry and the outlaw of burning.

The public and many municipal officials refused to believe backyard incinerators could be significant until incineration was outlawed. The immediate and visible effect on smoke showed that at least part of our smog problem was due to these outmoded devices.

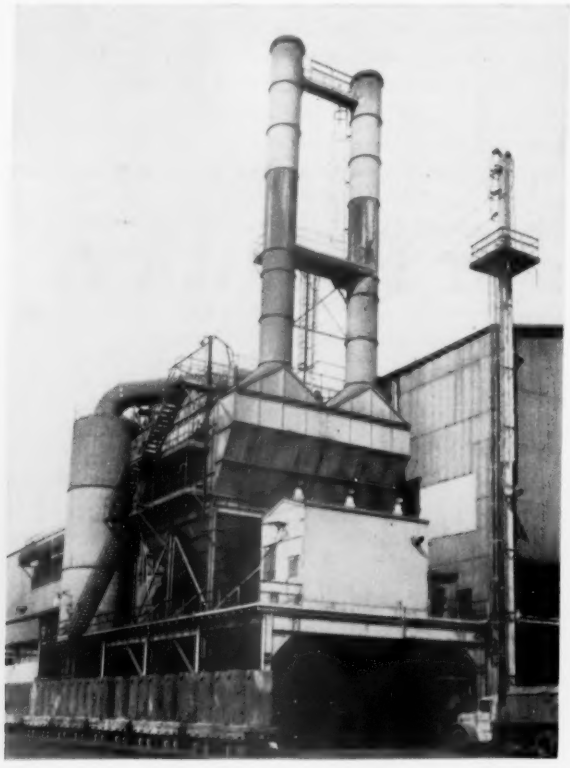
Faced by a problem that affects every citizen and every family, and that involves expense for trash collection and remedial devices or restricted use of automobiles, the public have become susceptible to the proponents of various patent medicine solutions. Some have proposed giant fans to act as artificial wind machines to overcome the lack of wind that exaggerates the smog problem here. Others have alleged that some minor constituent of gasoline is the cause, ignoring the cracking process that goes on in the engine. Others have alleged that smog is a natural phenomenon, although it has been shown that smog appeared only after population and industry had become substantial.

Many insist that industry is the sole offender. In a sense, this is true, because if industry had not expanded, the population rise that is at the root of the problem would not have occurred. Most of these advocates of

Industrial stacks smoking, precipitator off.



Industrial stacks with no smoke, precipitator on.



A backyard incinerator. This source of air pollution has been eliminated by a County ordinance which became effective in October, 1957. There were about 1,500,000 of these small smog generators in the Los Angeles basin.

fallacious solutions are sincere but uninformed. Many are convinced that there is a great conspiracy between business and government to suppress effective control of industry because of the cost to industry. Some industries have been unwise enough to add credence to this view by violent opposition to any control on their specific operations. Other citizens who have been active in smog matters have been guided by political rather than scientific or engineering considerations. Some promoters and inventors have demanded large sums before revealing alleged secret devices or methods that are claimed to offer a complete solution.

THE resulting confusion in the mind of the public generally, and possibly also in the minds of non-technical elected officials, has created a problem in education of the public as to the scientific and technical facts that are firmly established by research as to the cause and abatement of smog. This is a situation that falls squarely within the public service objectives of the National and the California Society of Professional Engineers. Our Chapter Committee, headed by H. E. Karig, and our State Committee, headed by Dr. R. W. Sorensen, are studying the available remedial measures, and are attempting by meetings, testimony before legislative committees and by press releases to support sound and constructive measures, and to aid the Air Pollution Control District in urging legislative action on such measures, as well as assisting other professional groups such as that of the medical association.

Engineers in the chemical, mechanical and electrical branches are developing remedial devices for all forms of air pollution. But these devices will go unused, and the smog problem will grow to possibly dangerous proportions from the standpoint of community health unless the professional engineers go beyond the mere technical problem and assist in public education and in the demand for legislative action to force the use of the remedies developed. This public service function is one that should be undertaken by the societies of professional engineers at state levels, by NSPE, and by chapters locally. We are doing this aggressively here in Pasadena. It is also essential that positions taken be technically and scientifically sound, and we are fortunate in having either in our Chapter or closely cooperating many leaders in this field.

Pasadena Chapter activities have included cooperation with the Air Pollution Control District in a program of public education by statements, public meetings and testimony before legislative tribunals. A member of Pasadena Chapter, Dr. R. W. Sorensen, has received the County Clean Air Award for scientific work on the reduction of emissions of particulate matter from sources of this type of air pollution. We expect to offer testimony at hearings now anticipated on automotive exhaust control devices.

**—End.**

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## *The Authors . . .*

Mr. Holden

W. H. T. Holden was graduated from Yale College with a B.A. degree. Since 1950 he has been engaged in consulting engineering in Pasadena, California. He has been president of the California Society of Professional Engineers and national director of that Society. He is currently president of Pasadena Chapter, CSPE.

Mr. Holden was chairman of a County sponsored citizens' committee on Clean Air Awards, given in 1957 and 1958 to persons or organizations that have made important contributions toward the reduction of air pollution.

Mr. Karig

H. Edmund Karig was graduated from North Carolina State University with a Bachelor of Science degree in mechanical engineering. He is now a consulting mechanical engineer and a vice president of Carter Laboratories, Inc., Pasadena, California.

Mr. Karig has been a vice president and a director of the Pasadena Chapter, California SPE and has headed the Air Pollution Committee of this Chapter for several years.

# Law Day Joins Engineers' Week As Professional Observance

By
JOHN L. BAHR, P. E.
*Chairman, Engineers' Week Committee*

WHY an article on National Engineers' Week in a month so far away from George Washington's birthday?

There are several good reasons for a review of Engineers' Week objectives and results at this time. First of all, our colleagues in the legal profession have recognized the need for an informed public in sponsoring the first Law Day, on May 1. The legal profession should be congratulated for this step. On this occasion, lawyers, judges, and justices of the U. S. Supreme Court joined in a nation-wide tribute to the concept of law upon which our democratic institutions are founded. The observance, originated and sponsored by the American Bar Association, was widely publicized throughout the newspaper and magazine press—in fact, the president of the ABA was pictured on the cover of *Time* magazine in connection with a feature article on Law Day.

Some engineers have not given their wholehearted support to Engineers' Week because of a feeling that such activity might be unprofessional. I am sure these few engineers would change their views if they were aware of the widespread favorable attention given to the Week. There are a number of health "days" and "weeks" through the year which are actively supported by local and state medical societies. The observance and sponsorship of Law Day by the legal profession would seem to indicate that attorneys see no issue of unprofessionalism in such sponsorship.

It is certainly true that the setting aside of special "weeks" and "days" has been carried to an extreme by a profusion of commercialized schemes to sell more of this or that product. However, it is also true that most of these "weeks" and "days" have their inspiration in a central advertising office, with no local participation whatsoever. It would be most unfair to compare, or confuse, the bulk of these promotional enterprises with the three-level activities that go into the observance of National Engineers' Week.

I believe the observance of this annual event has resulted in a greater contribution to public service on the part of the profession than anything else we do the rest of the year. I further believe that few engineers—even those who are active in the programs of the Week—realize the scope of this public service contribution. Only by looking over the several thousand newspaper and magazine clippings on each Engineers' Week can one appreciate the widespread public notice given to the objectives of the observance throughout the country. The cumulative effect of this public notice will surely have a definite influence in helping to orient public opinion regarding the engineer and his work.

John L. Bahr

International developments during the past year in the field of science and technology have been such that many of the things we have emphasized for National Engineers' Week projects have become important to the point of actually determining our survival as a free nation. Take education in basic math and the physical sciences, for example. Many local NSPE chapters have taken a vigorous leadership in their communities in prompting a re-evaluation of public school educational programs in these subjects. Local Engineers' Week committees have sent speakers to civic and school groups to urge greater emphasis on algebra, geometry, and physics; career conferences have been organized to help high school seniors gain an understanding of what is involved in a career in engineering or the sciences; guided tours have been sponsored during Engineers' Week to local manufacturing plants and research laboratories; and scholarships and other awards have been presented to outstanding students. Indeed, almost all of the criticism of our educational deficiencies that we now hear from all sides has been expressed in local Engineers' Week programs for the last several years.

In the career conferences held during the Week, we find high school juniors and seniors having the opportunity to hear professional engineers in a variety of specialized fields discuss the educational background necessary for college work in engineering, and the kind of aptitudes needed for each of the engineering branches. What these youngsters are actually getting is a definition of the engineering profession. And they are getting it at a crucial time with regards to making their own career decisions. This whole program is based on the idea that each profession has a responsibility to present top level guidance to interested young people who have the proper qualifications.

In its educational aspects alone, the observance of National Engineers' Week would be a public service contribution of immense value. But the over-all program for the Week touches on many subjects other than education. Most of the local projects for Engineers' Week involve calling attention to the role of the engineering profession in building for progress. This in turn generates considerable public information of the vital nature of such things as municipal sanitation and traffic accomplishments, flood control, irrigation, hydroelectric power sites, industrial research and development, and so on through the long list of other engineering responsibilities.

The NSPE Board of Directors opened its recent policy statement on America's role in the exploration of outer space with the following paragraph:

"The ever-accelerating pace of developments in the fields of rocketry and space satellites is indicative of the existence of the new era which

this Nation and others are now entering. This new era—in reality an integral part of a broad expansion of scientific and technological activity—can be summed up in a general way as the era of the exploration of the space outside the atmosphere of our planet. It is already becoming apparent that the exploration of our solar system will present man's greatest technological and intellectual challenge for generations to come."

To meet this challenge outlined by the NSPE Board, we must have an informed public—people who are truly aware of the significance of science and technology in our lives today. In its seven-year sponsorship of National Engineers' Week, the National Society has definitely helped in the furthering of public understanding of how engineering knowledge and skills are the the basic foundation for progress in controlling our physical environment.

Engineering is now moving into some of the most exciting areas of human accomplishment. The need for an informed public will increase in direct proportion to advances in space technology, nucleonics, electronics, and the like. The annual observance of a special Engineers' Week will continue to present an opportunity to the engineering profession for bringing information before a broad segment of the American public.—**End.**

## JUNE MEETINGS OF NOTE

**Society of Naval Architects and Marine Engineers**—Spring Meeting, June 2-3, Chamberlin Hotel, Old Point Comfort, Virginia.

**National Telemetering Conference**—June 2-4, Lord Baltimore Hotel, Baltimore, Maryland.

**American Nuclear Society**—Annual Meeting, June 2-5, Statler Hotel, Los Angeles, California.

**American Rocket Society**—Semi-Annual Meeting, June 8-11, Statler Hotel, Los Angeles, California.

**Society of Automotive Engineers**—Summer Meeting, June 8-13, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

**American Society of Mechanical Engineers**—Semi-Annual Meeting, June 15-19, Hotel Statler, Detroit, Michigan.

**American Society for Engineering Education**—Annual Meeting, June 16-20, University of California, Berkeley, California.

**American Society of Agricultural Engineers**—Annual Meeting, June 22-25, University of California, Santa Barbara, California.

**American Institute of Electrical Engineers**—Summer Meeting, June 22-27, Statler Hotel, Buffalo, New York.

**American Society for Testing Materials**—Annual Meeting, June 22-27, Hotel Statler, Boston, Massachusetts.

**American Society of Heating and Air-Conditioning Engineers**—Semi-Annual Meeting, June 23-25, Nicollet Hotel, Minneapolis, Minnesota.

**American Society of Civil Engineers**—Convention, June 23-27, Multnomah Hotel, Portland, Oregon.

# Tallamy to Speak at NSPE Annual Meeting

Federal Highway Administrator Bertram D. Tallamy will be the featured speaker at the Friday luncheon at NSPE's annual meeting in St. Louis, Mo., June 11-14. Mr. Tallamy will discuss the impact of the road program upon our over-all economy and the role of the professional engineer in this huge project.

The twenty-fourth annual get-together of the National Society will be held in the Chase-Park Plaza Hotels.

Bertram D. Tallamy

An NSPE's Past Presidents' Dinner is scheduled to get things underway on the evening of Wednesday, June 11. Former Society presidents will be honored at this dinner, which will also include a welcome address by St. Louis Mayor Raymond R. Tucker and "The State of the Society" address by Garvin H. Dyer, outgoing NSPE president.

Two days of professional meetings are planned, with June 13 to feature a series of functional section conferences as well as a panel discussion on the technician and the engineering profession. The functional section conferences will be concerned with the engineer in private practice, education, industry, and government.

At the closing banquet on June 14, the 1958 NSPE Award will be given to Nathan W. Dougherty, dean emeritus of engineering at the University of Tennessee. Alex Van Praag, a past president of the National Society and currently chairman of the Awards Committee, will make the presentation.

Dean Dougherty, the eighth recipient of the Award, was chosen "in recognition of his outstanding leadership in his profession as evidenced by his devotion to the advancement of engineering education, his sympathetic encouragement of students of engineering, his zealous promotion of the ideals and principles of his profession, and his humanitarian interest in his fellow men."

The installation of the 1958-59 NSPE officers will also be held at the banquet. Dr. Clark A. Dunn is the new president who will officially take over July 1.

# *NSPE Urges Higher Per Diem Rate*

A maximum per diem rate of $100 for temporary consultants engaged by the Federal Government has been urged by the National Society of Professional Engineers in recommendations made to Congressional appropriations chairmen.

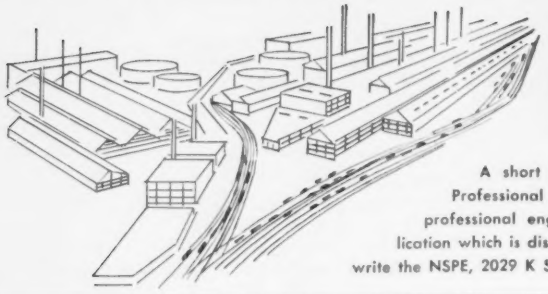
The National Society points out that the maximum current per diem rate of $75 is insufficient for the economically feasible performance of consulting engineering services due to the existing high overhead expenses.

The Society's recommendations call attention to the National Society's position that "the Federal Government deserves and is entitled to the very best engineering talent obtainable."

The National Society also calls attention to the fact that "the net result of a Federal limitation less than $100 per day could very well be that the most qualified engineering firms would refrain from undertaking engineering projects for the Government, leaving the Government's choice to less qualified consultants."

The National Society's recommendation called attention to the "serious problem for the nation if the armed services are unable to recruit and retain the highly-qualified engineering and scientific officers needed at a time when we are entering into national defense operations involving rocketry, space exploration, application of atomic-powered vehicles, and many other technological developments of the greatest significance."

# ENGINEERING EMPLOYMENT PRACTICES



# DIGEST

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ Professional-exempt employees under the Wage-Hour Law will have to be paid at least $95 a week to qualify under new minimum salary tests announced by the Wage-Hour Division, Department of Labor. The present minimum salary for professional and administrative employees is $75 per week. The higher figure follows hearings held two years ago. Under the so-called "short test" for professional employees, the minimum salary will be increased from $100 to $125 a week.

The Wage-Hour Division report rejected an NSPE-sponsored proposal that the minimum salary not be applicable to professional engineers registered under state law. The suggestion was based on the existing exception for licensed doctors and lawyers practicing their professions. The NSPE proposal to extend the same recognition to registered engineers was turned down, the report said, because it would apply only to part of the profession. "Many engineers . . . who do not possess licenses or certificates qualify for exemption on the basis of their duties and salaries. To provide an exception on the basis proposed would result in unequal treatment under the regulations."

* * * * *

**✓ The Department of Defense has announced that it will not attempt to establish fixed quantitative standards to measure reasonableness of contractors' costs for the recruitment of engineers and scientists. A Congressional committee has been very critical of government practices in reimbursing defense contractors for recruitment costs which were considered exorbitant. The Defense announcement lists eight general points which will be considered in evaluating proper reimbursement for recruitment charges.**

* * * * *

✓ The Administration's bill to create a National Aeronautics and Space Agency contains a precedent-making proposal concerning compensation of engineers and scientists in the Federal service. The bill would authorize the new agency to pay salaries "which are reasonably comparable with prevailing rates paid by non-Federal employers for similar work . . ." The President's message to Congress said this broad authority is needed for the agency to attract and retain the services of scientists and technicians. Civil Service Commission Chairman Harris Ellsworth has endorsed the provision with the understanding that Civil Service standards will generally be followed. He warned, however, that Congress "may soon have to face the problems of other agencies engaged in critical developmental activities such as the great research enterprises in the Department of Defense and many of those in other long-established agencies which do not have the proposed authority." Ellsworth said the new provision is an experiment which will provide a pilot operation to aid in developing better ways to set salaries.

* * * * *

**✓ The NLRB has held that methods, planning, and time-study employees are professionals under Taft-Hartley, while procedures and office methods employees, cashiers, secretaries and specialists in budgets, measurements, internal auditor and computer programmer are nonprofessionals. The Board cited formal training, the non-routine nature of the work, and intellectual activity and imagination in the case of the professionals. The electrical workers' union attempt to hold an election among the professional employees was rejected because other engineers who are also professionals were excluded from the proposed voting unit.**

* * * * *

✓ The Canadian Council of Professional Engineers has released the results of its survey of engineering salaries as of December 1, 1957, the figures for All-Canada being: median, $7,700; lower decile, $5,500; lower quartile, $6,400; upper quartile, $9,700; upper decile, $13,200. By provinces, the medians were: Alberta, $8,400; Quebec, $7,800; Ontario, $7,700; British Columbia, $7,600; Saskatchewan & Manitoba, $7,300; Maritimes, $7,200.

* * * * *

**✓ The Supreme Court has refused to review the ruling of an appeals court that the Sperry Gyroscope Co. must arbitrate the engineering and technicians union's claim that pay increases for engineers transferred to a new plant in Utah were not merit increases under the collective bargaining contract.**

* * * * *

✓ An editorial review by *Steel* magazine concludes that the white collar unionization drive, including engineers, won't go far in 1958, but will pick up steam in the following years. In the case of engineers, one of the main reasons given is the split between ESA and ESG, rival factions in the engineering union movement. The articles advise management, "don't wait to put your house in order." Suggestions cover salaries and fringe benefits, grievance mechanisms, promotion policy, educational opportunities, merit review program for professionals, and attention to status and personal recognition factors, especially for the professionals.

* * * * *

**✓ A survey of employment preferences of physicists by Personnel Administration uncovers some data of general interest in scientific employment patterns. The highest percentage would prefer to work in a college or university, followed by industry as a second choice. Government was the low choice. The type of highest degree held was a major factor in the preference; those with doctorates strongly favoring the academic life and those with a B.S. strongly favoring industrial employment. Average minimum salary requirements, regardless of degree level, were $6,216 from a college or university, $7,008 from industry and $6,894 from government.**

# The Corps of Engineers' Registration Program

By
COLONEL CLAYTON A. RUST,
*United States Army*

THIS is an age of dramatic change in the application of engineering science to warfare. Atom bombs, guided missiles, and earth satellites are making ever-increasing demands on the skill and ingenuity of the best technical brains of our country. This awesome challenge has provided the catalyst necessary to mobilize engineering skills and scientific know-how into a single herculean effort aimed at consolidating this country's position as the world's leader in applied technology. The needs of the military are suddenly discovered to be identical with the needs of industry: basic research in one area finds exciting application in the other. This community of national interest resolves itself finally, at the working or laboratory level, into a team effort which finds representatives of industry and the military working together, side by side, in pursuit of related objectives.

As members of the Corps of Engineers we find ourselves being drawn more and more into intimate personal contact with our professional contemporaries in industry. In these contacts it becomes increasingly important that the military engineer establish and maintain his individual reputation. One positive means of accomplishing this objective is to become registered as a licensed professional engineer. Such qualifications provide eloquent testimony to the professional competence of the individual, and enhance the prestige and eminence of the Corps of Engineers.

But what is meant by "Registration?" To the state legislatures engineering registration is a means of protecting the life, health, and property of the public. Legal registration permits only those engineers to practice who can safety serve the public, and denies such opportunity to those who are incompetent. To the individual engineer registration creates a definite recognition of the professional status of engineering and forces attainment of a higher standard of engineering practice. Engineers who meet the practical and academic prerequisites share a mutual professional experience which assures that practicing engineers are qualified in their respective fields. The courts have determined that the construction of buildings, water systems, sewage disposal plants, electrical systems, heating plants, etc., involve public health and safety and therefor justify the requirement of registration for those responsible for their design.

There is no law requiring Federal registration, but the Army Organization Act of 1950 requires that officers engaged in the performance of professional work have professional competence equivalent to that of persons performing similar work in private or civil practice. It is the responsibility of the chief of engineers to insure that the officers and civilian employees engaged in engineering work for the Corps of Engineers are professionally qualified. In recognition of this responsibility, and in support of the U. S. Army Engineer School's Professional Engineer Preparatory Program, Major General E. C. Itschner, chief of engineers, has stated:

"To the officer in the Corps of Engineers professional competence means being both a soldier and an engineer. As to maintaining technical engineering proficiency in this dynamic world, I know of no better way than participating in professional societies and obtaining any professional licenses for which you may be qualified. This voluntary program—is designed to provide the means for obtaining professional acceptance and recognition in the form of registration as a professional engineer. I therefore consider it an important part of our continuing program to improve the professional qualifications of the Corps and urge all personnel to avail themselves of this splendid opportunity."

THE Professional Engineer Preparatory Program conducted

A factory representative of International Harvester demonstrates one of their products during on-the-job training for students of the Dept. of Technical and Mechanical Equipment.

Instructors, l. to r., Cpl. Floyd Fults; Cpl. Louis W. Graiff; and Cpl. James H. Tompkins, attach a cutaway fuel injection pump housing to the D-6 Caterpillar engine being reconstructed in the Diesel Engine Section, Dept. of Technical and Mechanical Equipment, TES.

at the U. S. Army Engineer School, Fort Belvoir, Virginia, and referred to by General Itschner was initiated in 1956 and is now conducted annually. It provides for a three-hour session each Saturday morning for approximately twenty-two weeks, plus home study and working of problems in advance of scheduled sessions as desired by the participant. The organization and methods used in the program are readily adaptable to use by state societies and local chapters of National Society of Professional Engineers and other professional groups in preparing young engineers for their local examinations.

The program is a voluntary, mutual assistance endeavor.

GENERAL SCHEDULE

EIT PHASE

| | Groups A & B (CE) | Group C (CE, ME) | Group D (ME, ChE, EE) |
|---|---|---|---|
| 1st Week | Introduction — 1 hr<br>Economics I & II — 2 hrs | | |
| 2d Week | Economics III, IV, V — 3 hrs | | |
| 3rd Week | Economics VI, VII — 3 hrs | | |
| 4th Week | Economics VIII — 3 hrs | | |
| 5th Week | Mathematics, Chemistry — 3 hrs | | |
| 6th Week | Mechanics, Machine Design — 3 hrs | | |
| 7th Week | Electricity — 3 hrs | | |
| 8th Week | Electricity, Thermodynamics — 3 hrs | | |
| 9th Week | Thermodynamics — 3 hrs, | | |
| 10th Week | Hydraulics — 3 hrs | | |
| 11th Week | Hydraulics<br>Structural Analysis & Design — 3 hrs | | |
| 12th Week | Structural Analysis & Design<br>Construction Materials — 3 hrs<br>Layout | | |
| 13th Week | Orientation — 1 hr<br>Examination — 2 hrs | | |

PROFESSIONAL PHASE

| | Groups A & B (CE) | Group C (CE, ME) | Group D (ME, ChE, EE) |
|---|---|---|---|
| 14th Week | Ethics & Practice — 2 hrs<br>Guest Speaker – Professional Ethics — 1 hr (Auditorium) | | |
| 15th Week | Hydraulics | | Mechanical Engineering |
| 16th Week | Construction Materials<br>Sanitary Engineering | | |
| 17th Week | General Civil Engineering | | Chemical Engineering |
| 18th Week | Ditto | Mechanical Engineering | Ditto |
| 19th Week | Structural Analysis & Design | | Electrical Engineering |
| 20th Week | Optional* | Mechanical Engineering | Ditto |
| 21st Week | Optional* | | |
| 22d Week | PE (Auditorium) | | |

* Optional periods may be used for review or additional work in other fields omitted from regular program of the group concerned.

The basic theory is that the combined knowledge and experience of the participants is sufficient to explore the technical and professional practice aspects of almost any problem appropriate to an examination. As volunteers, it is presumed that the participants are sincere in their desire to obtain their registration. It is this personal motivation that makes the approach used a practical one. This concept can be applied wherever two or more persons desiring either simple refresher or extensive preparation can gather.

The program is conducted in two phases: An engineer-in-training or refresher phase, and a professional engineer phase. Generally, the program consists of the following:

a. Systematic review and discussion of typical problems and pertinent engineering or scientific principles. (Forty-five hours)

b. Fundamental instruction in professional ethics, engineering economics, and general aspects of state laws affecting practice and registration. (Fifteen hours)

c. Familiarization with examination formats and procedures. (Six hours)

d. Participation in state examinations as desired by the individual participants. (Optional)

As conducted at the U. S. Army Engineer School, emphasis is placed on requirements in the States of California, New York, Maryland, Virginia, and the District of Columbia. Interest in Virginia, Maryland, and the District of Columbia is purely local; the requirements of California and New York are considered to be of such scope and variety as to insure adequate preparation to meet the requirements of most other states.

The participants are organized into one or more discussion groups, optimum size being between ten and fifteen persons. The professional talents available are distributed equally among all the groups established, particularly during the EIT or refresher phase. During the PE phase specialized groups can be organized if there are a sufficient number of participants with specialities to make it worthwhile.

EACH discussion group is led by a monitor appointed from its members. His primary duty is to control the manner in which group discussions are conducted. *Moni-*

Pfc. Donald L. Jerome, an instructor in the Tractor and Scraper Course, left, supervises as Cpl. Ramon T. Jenson, center, and Sgt. Louis R. Harmon place brake shoes on an M-12 scraper.

*tors are not instructors:* they are discussion moderators appointed to keep the program moving and to accomplish nominal administration in keeping records and assigning problems for preparation and presentation.

In advance of each discussion period the group monitor assigns specific problems to one or more participants, preferably on a voluntary basis and in accordance with educational or experience backgrounds. The participant must work the assigned problem and be prepared at a designated session to submit a written solution and to discuss it in three parts:

a. Texts or other references where complete discussion of technical principles can be found and studied.

b. Brief explanation of the engineering or scientific principles as they apply to the problem.

c. Detailed solution of the problem.

Each participant is expected to work, before each session, at least four or five additional problems freely selected from the subject area scheduled for discussion. Comparison of these free solutions to that presented by the participant to whom the problem was assigned is the basis for general discussion. General agreement on a solution, finalized or developed through discussion, is the only basis for the validity and acceptance of the final result. There are no official solutions available for distribution. Discussion and presentation of problem solutions is a responsibility of the participants. Obviously, if no one works assigned problems, there will be no beneficial discussion possible. If the program lacks interest or vitality, the participants are not doing their part.

As everyone becomes familiar with the mechanics of discussion and actively participates therein, the program develops some very constructive and educational sessions. Comparisons of solutions, freely arrived at, develops an appreciation for the many points of view that can be taken by an engineer—most of which can lead to an acceptable solution. Recognition of these points of view and the alternative solutions to which they lead cultivates professional breadth and judgment. This recognition is of vital importance to a professional engineer whose duty it is to find the *best* solution for the circumstances, not merely an *acceptable* solution. Finding the *best* solution is an obligation to the client or employer.

Sfc. Ralph E. McNaughton conducts a class in the operation of a pan, one of the large pieces of heavy equipment used by The Engineer Center.

Cpl. Burl G. Short, instructor, helps Pvt. John D. Miller with a problem in the topographical computing course offered at the Engineer School.

Any program sponsored by a local society would require a program director to coordinate the activities of the separate groups. This function would include: administrative arrangements for supplies and classrooms, arrangements for teachers or guest speakers as may be necessary to conduct instruction in the fundamental subjects listed above, and designation of group monitors.

In the two programs completed to date 415 participants have enrolled. This number includes federal civil service employees, engineer officers, and enlisted scientific and professional specialists. Of this number 259 have completed the 60-hour program. Unfortunately, the wide differences in professional status of participants and the wide geographical distribution of their professional interests precludes any measurement of success in actually obtaining registration. It is hoped that cooperation of future participants in reporting their success or failure will permit an effective evaluation of the program.—**End.**

## *About the Author . . .*

Col. Rust

Colonel Clayton A. Rust, until recently, was director, Department of Engineering, U. S. Army Engineer School, Fort Belvoir, Va. He is a graduate of the United States Military Academy, 1940, and California Institute of Technology, Pasadena, Calif., where he received a Master's Degree in civil engineering.

During World War II, he served in Europe as commanding officer of the 276 Engineer Combat Battalion assigned to the III Corps and XVIII Airborne Corps of First Army. He later served three years as executive officer to the chief engineer, European Command, and spent two years as assistant to the district engineer, Walla Walla District, Washington, where he supervised the military construction program at Camp Hanford and several northwestern airbases.

During the Korean conflict, he served as operations officer, 417 Engineer Aviation Brigade. Colonel Rust is a registered professional engineer in New York State and a member of the National Society of Professional Engineers, the Society of American Military Engineers, and the Association of The United States Army. He is currently under orders to Ankara, Turkey, where he will be the engineer, U. S. Army Element, Joint US Mission for Aid to Turkey.

*From the President's Committee on Scientist*

# A Current Summary
# Supporting Technical

IN April, 1956, President Dwight D. Eisenhower, upon recognition of the need and on recommendation of his advisors, established what has developed into The President's Committee on Scientists and Engineers. The members of this group include presidents of nineteen major organizations in science, business, education, government and labor. Through the chairman, Dr. Howard Landis Bevis, the President charged the Committee to:

"1. Assist the Federal Government in identifying the problems associated with the development of more highly qualified scientists and engineers.

"2. Enlist the cooperation of all interested individuals and groups in analyzing the problem and developing programs to deal with it, and to take the lead in coordination of interested organizations outside the Federal Government.

"3. Make available to all interested organizations information on effective ways of overcoming the obstacles to the training of more qualified scientists and engineers.

"4. Publicize the problem and possible solutions in order to stimulate widespread public understanding and support.

"5. Provide me from time to time with a report of progress."

These instructions were amplified in the statement of purpose issued by the Committee itself.* The following are excerpts which relate to supporting technical personnel:

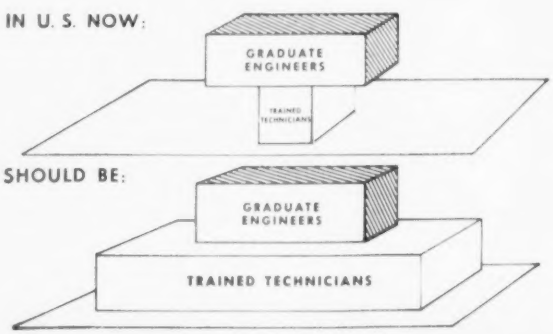
"Many scientists and engineers are being used in positions which do not make full use of their technical training. Frequently, they are forced to spend much of their time in routine tasks and subprofessional duties because of the shortage of technicians and engineering assistants. The professional societies and some businesses have been greatly concerned about this problem and have attempted to stimulate solutions. A 10-percent improvement in the utilization of all engineers would be equivalent to a 10-percent increase in the supply. Furthermore, upgrading of job duties would make it possible to pay higher salaries, thus making the profession more attractive.

"Step up utilization of technician and subprofessional schools by encouraging qualified young men and women who have the interest in engineering and sciences, but who do not undertake college courses, to prepare themselves as technicians and subprofessionals.

"Place more emphasis on career opportunities for subprofessional and technician personnel so that trained scientists and engineers may be free to perform effectively within the professional limits of their fields. The practicality of more 2-year courses in these fields and additional 2-year technical schools should be studied; industry should increase its efforts to find employees who can be trained as technicians and to encourage such training."

The President's Committee took immediate action and in May, 1956, appointed two major task forces, followed later by a third, which with five others became the basic working committees in the accomplishment of the President's charge. The first appointed was the Working Committee for the Development of Supporting Technical Personnel, which it was my privilege to serve as chairman; the second, the Working Group for Long-Range Improvement of Science and Mathematics Programs in Elementary and Secondary Schools chaired by Dr. Edgar Fuller, and the third, the Task Force on Utilization of Scientists and Engineers, chaired by Dr. Eric Walker.

This article is a summary of those phases of the final report of the Working Committee for the Development of Supporting Technical Personnel which may be of particular interest to engineers who have management responsibilities. The Working Committee, listed at the conclusion of this article, was composed of educational administrators in the technical institute field representing public, proprietary and endowed type institutions, government officials in personnel administrative positions, and analogous administrators in industry and labor. The group was well integrated at the outset, primarily through long-standing mutual responsibilities in technical society work, particularly within the Technical Institute Division of the American Society for Engineering Education. Coupled with excellent staff support, especially that of the group secretary, Dr. Eugene Vinogradoff, this close association formed the opportunity for expeditious progress in the assignment.




*The National Committee for the Development of Scientists and Engineers—Together With A Staff Statement of the Problem and Some Suggested Solutions, National Science Foundation, Washington, D. C. NSF-56-10, May, 1956.

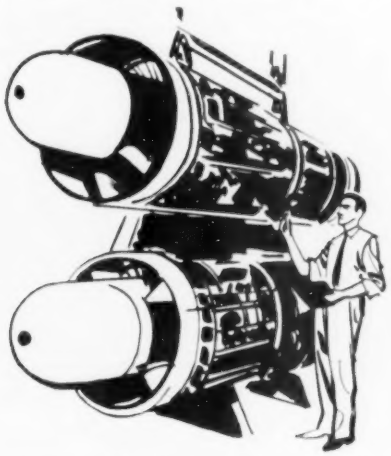
# ...nd Engineers Comes:

# ...n ...Personnel

By
KARL O. WERWATH, P.E.
*Committee Member and President, Milwaukee School of Engineering*

### Improving Engineering Efficiency*

"The technological team of the United States includes several types of technical personnel: the professional, namely the scientist and engineer; the semi-professional, the scientific and engineering technician; and the craftsman, which includes the artisan. To meet the demand made by technological advances, modern nations world-wide, including the United States, need to develop increasing numbers of personnel in each of these categories each year. The shortage of graduates in the sciences and engineering calls for a critical review of all phases of the educational processes which develop this personnel. We are here concerned, however, only with supporting technical personnel to the professional scientist and engineer.



"One way to help meet the shortage, the Working Committee believes, is to increase the supply and quality of supporting technical personnel which can assume certain duties now performed by professional people, releasing more time of the professional person for strictly professional pursuits. If efficiency in scientific and engineering effort, for instance, could be increased by 10% we would have the equivalent of providing 70,000 additional scientists and engineers. This would do much to relieve the situation in the immediate future. But such development is dependent on the availability of an adequate supply of qualified supporting technical personnel for both scientific and engineering pursuits.

*Final Report to The President's Committee on Scientists and Engineers from the Working Committee for the Development of Supporting Technical Personnel, June 30, 1957.

"We are now graduating only a fraction of the required number of highly skilled scientific and engineering technicians through accredited or approved courses in the United States. . . . The crucial need is for scientific and engineering technicians who have sufficient formal higher education and training of collegiate level to communicate successfully with the professional scientists or engineer in carrying out technical work and who are men capable of assuming the responsibilities of a scientific and engineering technician."

### Defining Technical Supporting Personnel

"The scientific technician and the engineering technician have become a necessary part of the American industrial team, with increasing responsibilities. The scientific or engineering technician generally works in one of three areas:

1. Research, design, or development;
2. Production, operation, or control;
3. Installation, maintenance, or sales engineering.

"When serving in the first of these functional categories, he directly assists the scientists or engineer. When employed in the second category, he executies a plan laid out by the scientist or engineer, but he does not usually work under direct supervision. When active in the third category, he frequently does what would otherwise have been done by the scientist or engineer. In our growing technologically based economy, the scientific or engineering technician must have a background in post-secondary school mathematics and the principles of physical and natural science, which makes it possible for him to understand and communicate scientific or engineering data, mathematically, graphically and linguistically.

"While the engineer plans, the technician makes and does; while the engineer creates the technician applies. The scientific or engineering technician often provides the liaison between the professional man and the craftsman and may thus have varying degrees of leadership responsibilities. He must have the same basic characteristics and fulfill the same fundamental educational requirements as his professional counterpart, except that his interest and education are more in the direction of application, with less mathematical and theoretical depth. He takes the instructions of the professional scientist or engineer and either personally translates them into action or directs their execution by other supporting technicians and craftsmen. Therefore, his preparation must of necessity be offered in the area of higher education."

### The Technical Institute Curriculum as a Type of Higher Education

"The 'Technical Institute Curriculum' is a specific type

of higher education leading to specific occupations or to occupational clusters or groupings of occupations . . . High school graduation or its equivalent is required for admission to technical institute type curricula and most institutions of higher learning have additional academic entrance requirements. Technical institute type courses are briefer and more practical in content than those of the professional engineering curricula. They are generally two academic years in length. They include a heavy schedule of specialized technical subjects which make up approximately one-half the curriculum in class time and total

student effort. These are integrated with related studies of college level, including Mathematics, Physical Sciences, Graphics, English, Economics, Industrial Commerce, Management and general studies."

### Academic Distinction—the Associate Degree

"Accredited courses generally lead to an associate degree in engineering or an associate degree in applied science. The Technical Institute Division of the American Society for Engineering Education, after long study, adopted a resolution, subsequently approved by the Society's General Council which reads in part:

'. . . in the interest of clarity and public understanding of the nature of the technical institute type of training and the place of the technician in industry all members of the American Society for Engineering Education be urged to make reference to graduates of technical institute curricula as Engineering Technicians, and advocate a designated associate degree as the appropriate title of accomplishment . . . continued effort be made to establish in the public mind the Associate Degree as recognition for the training of engineering technicians . . .'"

### Approved Courses

"About 100 courses are accredited by the Engineers' Council for Professional Development, or approved by the National Council of Technical Schools, . . . and are offered by one or more of such schools as:

1. Technical institutes, endowed or publicly supported.
2. Junior colleges offering terminal programs.
3. Evening sessions and extension divisions of colleges and universities.
4. Proprietary schools, operated by individuals or corporations.
5. Schools or training divisions associated with industries.
6. Specialized schools operated by divisions of government.
7. Correspondence schools.

"There are ten fields in which engineering technology courses for the development of engineering technicians have become prominent through employment opportunities which have demanded course development . . . These include:

1. Aeronautical
2. Air Conditioning, Heating and Refrigeration
3. Architectural, Building Construction and Civil
4. Electronics and Radio-Television
5. Electrical Power and Control
6. Instrumentation and Watchmaking
7. Mechanical Metallurgical
8. Photography, Chemistry and Optics
9. Steam, Automotive and Diesel
10. Others"

Against this background of the charge and the findings, the Working Committee reviewed possible steps to increase the supply of qualified scientific and engineering technicians through action by existing private and governmental agencies without expenditure of additional funds. The Working Committee resolved that action would be desirable in twelve major areas:

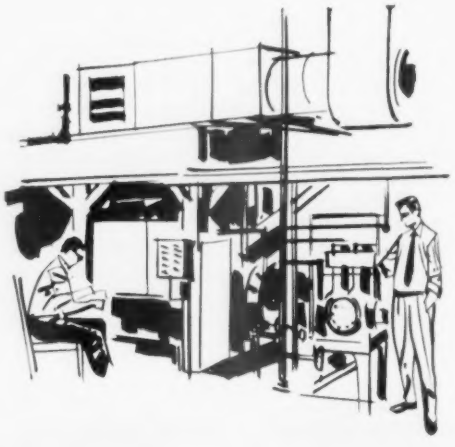
1. The Status of Scientific and Engineering Technicians

Among the many problems to be explored in increasing the number of scientific and engineering technicians is the question of status—that almost indefinable feeling of self-respect and worth. This includes not only the person but also his job. One must complement the other. Lack of status is seriously hampering the rapid development of the field of supporting technical personnel. Industry, government, and educational agencies still do not fully understand this question of status.

For example, industrial advertising instead of appealing exclusively to scientists and engineers should, when suitable, also appeal to potential scientific and engineering technicians in proper proportion. Better employer-applicant relations develop when a person is employed for the job he has been trained to do.

Today, because of their higher technical education, technicians take certain assignments that formerly were assigned to graduate scientists and engineers; however, their status and recognition often lag far behind their responsibilities. Too often the term "technician" refers to many other types of production employees. The Working Committee strongly recommends that the term "technician," a semantic generalization, be replaced by "scientific technician," "engineering technician," "engineering aide," and "engineering associate" to identify the specific type of technical personnel. It is believed that improved recogni-

*(Continued on page 43)*



# NSPE Presents Testimony Before House on Several Education Bills

**The following is testimony presented recently by NSPE before the Subcommittee on Health and Science of the House of Representatives' Committee on Interstate and Foreign Commerce.**

WE appreciate this opportunity of presenting our comments and suggestions on the several bills currently before this Subcommittee dealing with proposed amendments to the National Science Foundation Act. The National Society is vitally interested in all matters dealing with engineering and scientific education, and accordingly our discussion will primarily cover the various educational programs contained in these bills. Since there are major proposed programs common to several of the bills, it is our intention to comment on the specific program, rather than on each bill separately.

However, before we discuss the bills, there are two basic observations regarding education that we would like to present. First, public apathy toward education in general can be attributed to a large extent to the constant overemphasis on the cost of education, without a proper awareness of the many values and benefits which a highly educated population contributes to our national economy. Education is the lifeblood of our democratic society. Its absolute necessity should be foremost in our minds, and its cost should be recognized as an essential investment in the nation's future. In this connection, it is our belief that Federal departments and agencies presently involved with education should embark upon an extensive program of emphasis on the value of education, enlisting the support and cooperation of industry as well as the general public in this activity. No other investment can return the dividends that an efficient, stimulating educational system can provide.

Secondly, we believe that the local community has the primary responsibility to provide educational programs and opportunities for persons of that area. However we do feel that the Federal Government can by certain actions assist and enable the local community to more effectively discharge its educational obligations. In this connection, we are convinced that it is infinitely more effective for Congress to enact legislation that will *aid* the local community in its educational activities, rather than *subsidize* it.

Now we would like to direct our comments to the specific programs currently before this Subcommittee for consideration and study.

Several of the bills contain provisions calling for the establishment of undergraduate scholarship programs in the fields of engineering and science. The number of scholarships suggested is substantial—approximately 13,000 per year. The National Society believes that such an extensive scholarship financing program for undergraduate students would place the emphasis on the need for more students, at a time when engineering and scientific enrollments in U. S. colleges and universities are at an all time high and are growing rapidly. Engineering educators are today faced with the problem of providing the students they have with an adequate engineering education. Additional numbers of students, over and above the increased influx of students expected as a result of the high birth rate of the 1940's, will place a tremendous burden on existing facilities and faculty within the next two years.

Indeed, the President's Committee on Education Beyond the High School in specifically not recommending the development of a large-scale program of Federal scholarships stated that "it could accentuate the danger that enrollments will rise faster than the faculties and facilities needed to care for them, and it would not represent the most effective means by which such Federal assistance as may be needed could be used to aid both students and institutions. . . ."

**Nevada Society of Professional Engineers**—Annual Meeting, June 7-8, 1958, Reno, Nevada.

**NSPE Annual Meeting**—June 11-14, 1958, Chase-Park Plaza Hotels, St. Louis, Missouri.

**Missouri Society of Professional Engineers**—Annual Meeting, June 14, 1958, Chase-Park Plaza Hotels, St. Louis, Missouri.

**Georgia Society of Professional Engineers** — Annual Meeting, June 19-20, 1958, Jekyll Island, Georgia.

**North Carolina Society of Professional Engineers**—Summer Meeting, June 26-28, 1958, Greystone Inn, Roaring Gap, North Carolina.

**South Carolina Society of Professional Engineers**—Annual Meeting, June 28, 1958, Russell House, South Carolina University Campus, Columbia, South Carolina.

**Mississippi Society of Professional Engineers**—Summer Meeting, July 11-12, 1958, Buena Vista Hotel, Biloxi, Mississippi.

**National Society of Professional Engineers**—Fall Meeting, October 23-25, 1958, St. Francis Hotel, San Francisco, California.

The National Society is in complete accord with the President's Committee on this important point. We believe that the primary concern of the Federal Government should be with improving the quality of our college students, not their quantity. Engineering enrollment, for example, is higher today than at any other time in our history. Present enrollments justify the prediction that there will be 150,000 engineers graduated during the period 1956-1960 as compared to 95,300 engineers graduated in the four-year period ending in 1956. In addition, our expanding programs of education in technical institutes will further increase the total of engineering and supporting technical services.

Thus, it is questionable that this nation can adequately train and absorb, under existing conditions, increased numbers of engineering students pursuing their education only to the bachelor's degree. For these reasons, the National Society is opposed to any Federal undergraduate scholarship program in engineering or science.

Several months ago there began to appear a large number of articles and statements regarding the so-called "shortage" of engineering personnel, which in many cases called for large-scale crash programs to train thousands upon thousands of additional engineers. At the same time there arose many voices which said that we had and were continuously training an adequate number of engineers. Because this controversy so vitally concerned our national defense and welfare and the engineering profession itself, the National Society gave serious and extensive study to this situation, and developed a comprehensive statement regarding the "shortage" of engineering and scientific personnel in which several important observations were made. Copies of our "shortage" statement were attached as appendices to our presentations before the Senate and House education committees earlier this year on Federal aid to education, and we attach a copy of our statement to this testimony for your further information.

Although the National Society is opposed to any Federal undergraduate scholarship program which would award extensive numbers of scholarships annually, we would support a limited number of engineering and scientific scholarships, with no more than 1,000 per year, to be awarded at the national level as a recognition of scholastic achievement and merit. Such scholarships could be in the

nature of a prize granted to the top students throughout the country who have demonstrated a high level of aptitude for engineering or scientific studies. It is believed that such an honorary award, coupled with national publicity and recognition, could serve as a powerful incentive to scholastic attainment and would encourage those students with the highest potential to pursue their formal education.

The National Society of Professional Engineers strongly endorses and supports all plans which will expand in both number and coverage existing programs for the awarding of graduate fellowships in all fields of endeavor. With regard to engineering and science, we believe that graduate study is essential for the development of intellectual capacity to provide this nation with new ideas and inventions. Our rapid technological advances and the necessity for continued progress demand that our engineers and scientists be trained to the highest degree of competence and ability. Since only about one-half of the standard four-year undergraduate program consists of engineering subjects, it can readily be seen that with only one year of graduate study, the engineer can increase his technical competence by approximately fifty per cent. This is a significant indication of the extent by which the total competence of our engineering manpower can be increased by graduate study.

In addition to the over-all increase in capability resulting from graduate study in science and engineering, those who enter the field of engineering education can be better trained, resulting in consequent improvement in the quality of our collegiate education.

In connection with the field of engineering education, it is noted that certain of the bills currently before the Subcommittee would attach to the awarding of a graduate fellowship the condition that the recipient devote a period of time to the teaching of engineering courses in secondary schools. Certainly such a situation is highly desirable, for it is generally well-recognized that the most serious crisis facing our educational programs today is the shortage of highly qualified, first-rate teachers. In fact, the National Society believes that the Federal Government should take all possible steps to contribute to the ability of all educational organizations (primary, secondary and college) to attract and retain superior men and women in teaching positions.

However, though such an arrangement could go a long way toward a solution of two of the most pressing problems facing the country today, *i.e.*, the need for additional numbers of persons with post-graduate degrees and the need for qualified and responsible teachers, it is suggested that during the initial period of operation this should be considered a pilot project and a limited program be initiated. We have made this suggestion in view of the possibility that many persons might elect not to take advantage of the fellowship program due to the fact that a teaching obligation is imposed. Rather than set up a full-scale program with a teaching condition attached in the first instance, it is recommended that a trial run be initiated for the purpose of determining the degree of enthusiasm and interest.

As indicated above, the National Society strongly favors any Federal action which will assist our educational institutions to obtain and retain adequate numbers of qualified personnel for teaching positions. It has been stated many times before that perhaps the greatest deterrent facing individuals contemplating a teaching career is the low salary level currently being offered in comparison to other employed groups in our economy. The apparent limited opportunities salary-wise facing teachers today is perhaps most serious for teachers of engineering, science and mathematics who have been made well aware of the higher salaries their talents can currently command in industry and other areas of employment. It is essential, then, that some method be devised for letting these people know just how much their abilities are needed in the teaching field. In this connection, the National Society of Professional Engineers believes that it is more effective for the Congress to enact legislation that will enable a community to discharge its educational responsibility rather than to enact legislation that will subsidize educational activities in that community. By this we mean that the local community must be able to raise salaries of teachers in an effort to bring their total income up to a level comparable to salaries received by persons with similar qualifications in other fields of employment.

There is a great deal of merit in Representative Holland's proposal for the Federal Government to make payments to educational institutions for use as salary supplements to engineering teachers. This proposal recognizes the important role of the teacher in our continued technological advancement, since well-qualified teachers assure the adequate technical preparation of students for their chosen careers and stimulate the ambitions of those students with exceptional ability toward greater achievements.

While we endorse the sound motive of Representative Holland's proposal, the National Society cannot support the mechanism devised as a solution to the problem. It is our opinion that educational institutions should be encouraged and enabled to increase the salaries of their teaching staffs through means other than by direct Federal subsidies. Otherwise, there could be a gradual shifting over a period of time to a point where the salaries of engineering teachers are paid by the Federal Government. While there are areas in which the Federal Government can and should act to improve our educational systems, we believe the proper principle should be indirect assistance, rather than direct subsidy.

For example, we believe that the recent Internal Revenue ruling relating to the deductibility of the expenses incurred in increasing professional competence, as applied to the teaching profession, is the proper form of Federal action in this field.

We also present to this Subcommittee the important fact that in addition to salary adjustments, it is essential that teaching positions be made worthwhile to capable people both from the standpoint of prestige and professional recognition. Furthermore, the Society urges the establishment of a program by legislative action, in line with what industry is presently doing, to provide authority and funds to Government agencies for the temporary summer employment of teachers in positions that would improve their teaching ability and income.

Of direct concern to this Subcommittee, the National Society also recommends an expansion in the summer institute program of the National Science Foundation for the advanced training of high school science and mathematics teachers.

The National Society believes that the need for science and mathematics in the high schools is not alone for the preparation of people who will enter a college educational program where such training is essential to their progress. It is important that many other people who function in the present economy understand science and mathematics in order to be most successful and productive. In other words, science and mathematics are part of present-day culture and anyone who is not acquainted with this aspect of our civilization is not well grounded in the fundamentals essential to his cultural growth and his economic well-being.

For these reasons, we support in principle the proposals which would provide an award for mathematics proficiency designed to encourage and stimulate student interest along these lines. However, the National Society is of the opinion that the proposed program would prove more beneficial if the number of awards were greatly reduced, and the emphasis placed on excellence of achievement rather than on the passing of a standard mathematics examination. We believe that a limited number of such awards would greatly enhance their prestige and desirability and at the same time afford proper national recognition to the recipients. The value of such a program, as an incentive and stimulant, decreases rapidly as it becomes routine and easily attainable. We would, therefore, prefer a limited number of such awards for mathematics and science proficiency, each in the nature of a prize, and each carrying a more substantial stipend.

The National Society of Professional Engineers appreciates this opportunity to appear before you today and to present our comments and recommendations on various proposals to amend the National Science Foundation Act. We desire to cooperate with the Subcommittee to the best of our ability, and we stand ready to assist further in any way possible. —**End.**

## N.S.P.E. Believes

# Recognition of Registration

By Paul H. Robbins, P. E.

*Executive Director*

N. S. P. E.

It has been particularly heartening to members of NSPE to note the ever-increasing acceptance of registration as a mechanism for solving perhaps the profession's most difficult problem —the definition of who is an engineer and the correlated professional recognition of those so identified. Within recent weeks there has been indication from government, industry, and educational circles of increasing acceptance of the desirability of registration for those who can qualify.

The AMERICAN ENGINEER has reported from time to time complete details on the recognition of registration in various industrial companies. A recent conversation with a vice president in charge of personnel of one of the largest industrial employers of engineers resulted in the observation that perhaps no personal problem is receiving greater study in industry today than the procedures, policies, and atmosphere in which professional engineering and scientific personnel will be most productive. It was this official's opinion that it was essential that the engineering profession not only be identified by the users of engineering services, but that such identification be readily recognized by society as a whole. Within this framework, it was his opinion that the only readily-available answer was the registration procedure.

The newsletter of the U. S. Army Engineering School at Fort Belvoir in commenting on the desirability of registration for military personnel noted, "To the individual engineer registration creates a definite recognition of the professional status of engineering and requires a higher standard of engineering practice. General Itschner in remarks to the engineers both in uniform and civilian capacities in the Corps of Engineers said, "As to maintaining technical engineering proficiency in this dynamic world, I know of no better way than participating in professional societies and obtaining any professional licenses for which you may be qualified."

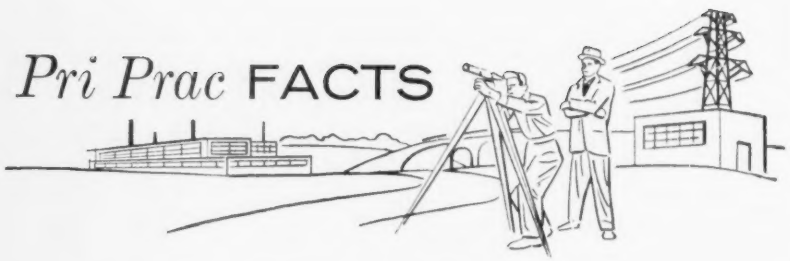
From the headquarters of the Air Defense Command comes the admonition to the engineers associated with this vital activity, "While engineers in the employ of Government are not required by law to register in the same manner as private engineers in order to practice, engineering registration gives recognition to the Government engineer and adds prestige both to him as an individual and to the agency he represents."

To the 1,800 engineers employed in the Bureau of Reclamation of the Department of Interior, Commissioner Dexheimer said, "I feel that registration as a professional engineer not only shows that the Bureau engineer is equally qualified with his contemporary in private practice to conceive and direct engineering work, but that by being registered he has evidenced his active interest in being recognized as a qualified member of his chosen profession."

These are indeed encouraging signs, for they sustain a long-standing belief of NSPE that a great many of the problems facing the profession, if not solved in their entirety, would be considerably eased if registration were more widely accepted among the qualified members of the profession.

Indicative of the fact that registration is becoming more widely accepted, a recent study by Purdue University of 5,000 engineering graduates of that institution developed the interesting statistic that of those graduates prior to 1940 an average of nearly fifty-five per cent had never put forth the effort to become registered. Since 1945, however, this rate has been appreciably decreasing—of the group from 1946 to 1950 only forty-one per cent have not become registered either as an EIT or a full professional engineer; of the group from 1951 to 1955 only thirty-seven per cent had neglected this important development; and only thirty-four per cent of the 1956 class were not registered either as EIT's or professional engineers. NSPE believes this trend to be significant for it has always felt it important that the engineer-in-training opportunities of our registration laws should be called to the attention of the young men of the profession. NSPE believes this study is further evidence that the profession is recognizing the importance of high standards as evidenced by the registration requirements of the individual states. —**End.**

# *Pri Prac* FACTS



THE annual meeting in St. Louis—June 13 for this Section—presents many opportunities and challenges to consultants. Due to essential lead time these paragraphs are prepared before mid-May but may not be yours to read till about the time of the meeting. Anyway—we expect you will be there in great numbers and will have much to discuss.

Often we fail to realize the many things accomplished for consultants by NSPE's capable staff and also by those dedicated individuals at state and local levels. For example:

An East Coast consultant was being harassed by a local field agency to fill out certain forms requiring detailed information on salaries and hours applicable to his employees. Investigation disclosed that the local agency was trying to apply a Federal law applicable only to "laborers and mechanics" and not intended to apply to employees of the consultant in other capacities, such as surveyors or draftsmen. A series of long-distance and local telephone calls in Washington eliminated the confusion and resolved the erroneous interpretation of the local field office of the agency.

At the operating level in applying Society policy particularly affecting consulting engineers, the Washington office reports that a West Coast member submitted evidence that a local office of a Federal agency had called for bids for engineering design service. Immediate contact with the agency headquarters produced a reply that "we have directed our regional office . . . to negotiate the contract for engineering services for the . . . facility. Further, we have issued a directive to all of our field offices that contracts for professional services should be on a negotiated basis rather than on a competitive bid basis." The agencies and individuals involved in these cases are not identified for obvious reasons of not jeopardizing the type of cooperative relations which produce these results.

State sections increase their activities. Ohio has been particularly active. Harold A. Kelley, partner in Jones, Henry & Williams of Toledo, is the new chairman. The consultants, through their firms, are voluntarily contributing to OSPE so that they may make greater use of the headquarters staff and facilities. A sub-committee composed of principals of firms is attacking the problems of recognition of the consultant, raising standards of the profession and adherence to the Code of Ethics, proper use of fees, proper hiring procedures, "free engineering" by manufacturers or suppliers, standardization of contracts and employee problems.

The "package deal" and other forms of so-called "free engineering" come in for continuing study and action. Several other chapter and state sections are actively combating this detrimental practice. The Section of the Western Chapter in Missouri is devoting its regular quarterly meeting to consideration of this subject. Kenneth H. Larkin is heading a group of speakers who will discuss both the "package deal" and "free engineering" as sometimes offered by contractors and equipment manufacturers. The results of these discussions will be reported June 13 in St. Louis.—**End.**

*Meet Me*

*in*

*St. Louis*

## *Society Urges Pay Legislation Revised*

Amendment of pending military pay increase legislation to authorize special salary increments for military officers in certain engineering and scientific categories has been urged by the National Society.

Members of the Senate Armed Services Committee were asked by the National Society to consider revision of the military pay legislation to allow the secretary of each armed service to declare certain engineering and scientific categories in scarce supply and of a critical nature, and authorize them to receive special pay as now prescribed for medical, dental and veterinarian officers.

As an alternate approach, the recommendation of the 46,000-member engineering society suggested that the concept of proficiency pay for enlisted military personnel, as passed by the House, could be broadened to include officers. Such a proficiency arrangement, if extended to officers, would permit each service to take reasonably effective action to stop the loss of key personnel in engineering and scientific fields, the Society said.

## *Society Secretaries Hold Conferences*

A series of regional conferences is being held for state society secretaries of NSPE to aid in solving some of their mutual problems.

Conferences have taken place in Billings, Mont., and Atlanta, Ga., with forthcoming sessions scheduled for Las Vegas, Nev., June 20-21, and Washington, D.C., July 11-12—the latter meeting will be for full-time secretaries.

Paul H. Robbins, NSPE executive director, is moderating these conferences as the secretaries gather in centralized locations to discuss their common interests and problems.

### *CALL FOR MEMBERSHIP ACTION ON FEDERAL SCHOLARSHIP PROPOSAL*

A compromise Federal aid-to-education bill has been reported by a House Subcommittee, calling for 25,000 Federal undergraduate scholarships per year for four years for all fields of study. NSPE has testified against Federal scholarships as being unnecessary and unfair to the over-burdened colleges, and placing emphasis on quantity rather than quality in higher education. Vice President Clark A. Dunn's testimony in full was published in the May issue of AE. State societies and chapters have been advised of this development so they may contact the congressmen for their areas. Interested members are urged to write immediately to their Congressman suggesting that the scholarship provision be deleted by the House. Other portions of the bill provide for loans for needy students, and other features not opposed by NSPE.

## *Reciprocal P.E. License Denied Without Exam*

In a recent significant decision, the Virginia State Supreme Court has upheld that State Board's refusal to register a professional engineer licensed in the District of Columbia, Georgia, and South Carolina unless the applicant would take and successfully pass either an oral or written examination. The engineer had obtained his license in the District under a grandfather clause, and in Georgia and South Carolina upon the basis of his D. C. registration without passing an examination of any type.

The case arose when the applicant sought registration in Virginia based upon his District of Columbia license. The applicant was notified that his application had been approved subject to his passing an oral examination. On the date scheduled the applicant appeared, but refused to answer any technical questions or to explain any plans or designs which he had submitted as evidence of his experience. Thereafter, he was notified that his failure to answer questions on an oral examination, necessitated his taking a written examination. On his failure to appear, his application was denied.

In reviewing the Board's action, the Court rejected the applicant's claim that it was the mandatory duty of the Board to issue him a license without examination inasmuch as he held certificates of registration as a professional engineer granted in other jurisdictions. Instead, the Court ruled that the Virginia Registration Act was permissive and not mandatory with regard to reciprocal registration, and that an applicant has no vested right to have the Board issue him a certificate merely because he holds a license granted by another jurisdiction.

The Court upheld the Board's interpretation of the Virginia Act to the effect that a "like unexpired certificate" of another state means a certificate granted by such authority after the applicant had passed an examination of a standard satisfactory to the Virginia Board. The Court then decided that the Virginia Act does not require the Board to issue any applicant a certificate of registration as a professional engineer in Virginia where it appears that such applicant has never taken and passed an examination in professional subjects. The Court said: "Indeed, the Board is not authorized to issue a certificate of registration until it has been satisfied that the applicant has taken and passed such an examination, and any rule adopted by the Board to the contrary is beyond the scope of its authority."

When the applicant contended that the reciprocity section of the Virginia Act was unconstitutional, the Court ruled that "no litigant will be heard to deny the validity of a statute under which he has chosen to proceed," and that when a person seeks to avail himself of the benefit of a statute, he is prevented from contesting its validity whether it be constitutional or not.

# Appeals Court Holds Corporate Practice Illegal in Wash., D. C.

The United States Court of Appeals for the District of Columbia has affirmed a decision of the local tax court that it is illegal for any corporation to engage in the practice of professional engineering in the District of Columbia. The decision, which concluded the first direct court test of this significant question, involved an interpretation of the D. C. engineering registration law which does not specifically permit nor prohibit corporate practice.

The case arose when a group of non-corporate professional engineers sought a refund of unincorporated business franchise taxes on the ground that the practice of engineering qualified as an exception to the definition of "unincorporated business," and as such was exempt from the levy of the tax. According to the applicable D. C. tax statutes, "The words 'unincorporated business' do not include any trade or business which by law, customs, or ethics cannot be incorporated." The parties agreed that the only question before the Tax Court was whether or not the practice of professional engineering could be incorporated under existing D. C. law.

In its brief decision, the Appeals Court declined to further comment on the issues stating that the Tax Court had adequately discussed the problem and reached the correct result. The Tax Court decision, written last October by Judge Morgan, said that the Superintendent of Corporations "should refuse to accept for filing, recordation and organization a certificate of incorporation filed by a group of persons for the purpose of engaging in the practice of professional engineering."

Judge Morgan relied heavily upon the 1955 decision in *Potomac Engineers Inc. v. D. C. Board of Registration for Professional Engineers* (AMERICAN ENGINEER, Feb., 1955) in which a Federal District Court held that a corporation, even though composed exclusively of registered professional engineers, could not obtain a license under the D. C. engineering registration law. The Court in the *Potomac Engineers* case stated that "traditionally, only natural persons can practice a learned profession, because only natural persons can be charged with the moral responsibilities that the practice of a learned profession requires."

Referring to the *Potomac* decision, Judge Morgan of the Tax Court declared: "The Court is of the opinion that the *Potomac Engineers* case established the principle that the practice of professional engineering in the District of Columbia by a corporation is unlawful. That being so, the Court believes that the practice of professional engineering is 'one which by law, customs or ethics cannot be incorporated' within the meaning of the Income and Franchise Tax Act. To hold otherwise would defeat the purpose of the professional engineers Registration Act as well as the Income and Franchise Tax Act."

Judge Morgan had recognized that at present there are many corporations engaged in the practice of professional engineering in the District of Columbia. His comment on this situation, approved by the Court of Appeals, is as follows: "This Court is aware that there are several corporations, both local and foreign, with offices in the District of Columbia, and having in their corporate names the words 'Engineering,' 'Engineers' or words of like import, and perhaps some or all of them give the impression or hold out that they can engage in the practice of engineering; and that maybe some of them do so engage. If a corporation should do so, it would violate the law and subject itself to criminal penalty. Moreover, it might be observed that many so-called 'engineering' corporations are no more than construction companies, which euphemistically include the word 'Engineering' in the corporate name."

The Appeals Court ruling, in effect, places engineers in the same class with lawyers and doctors who cannot incorporate under District of Columbia laws.

A spokesman for the office of the District's Corporation Counsel has said that the decision will be difficult to enforce and raises questions about the legality of contracts signed by professional engineering corporations.

# With Our Members . . .

***Robbins Speaks***

## General Mills is Host to Four Minnesota Chapters Recently

NSPE Executive Director Paul H. Robbins is shown, center, with engineers of General Mills, Inc., at a recent meeting in Minnesota. In the photo, l. to r., are: A. R. Ulstrom, staff engineer; Hans Schmelzer, director of engineering; Mr. Robbins; William C. Folk, executive engineer, and Howard B. Loomis, Jr., staff engineer—construction.

General Mills, Inc., recently played host to four Minnesota chapters in its beautiful new headquarters located on a 40-acre tract of the Minneapolis suburb of Golden Valley. Hans Schmelzer, director of engineering, General Mills, Inc., represented his company as official host.

During the evening, the company sponsored a dinner for nearly 200 members of the Minneapolis, Southdale, Twin Lakes and Minnetonka Chapters of MSPE.

The after-dinner address was given by Paul H. Robbins, NSPE executive director, on the topic, "Roadblocks to Professionalism." Following Mr. Robbins' address, Mr. Schmelzer and his engineering staff guided the professional engineers through the new home of General Mills, Inc.

### *Vice President Kidder Speaks to Mass. SPE*

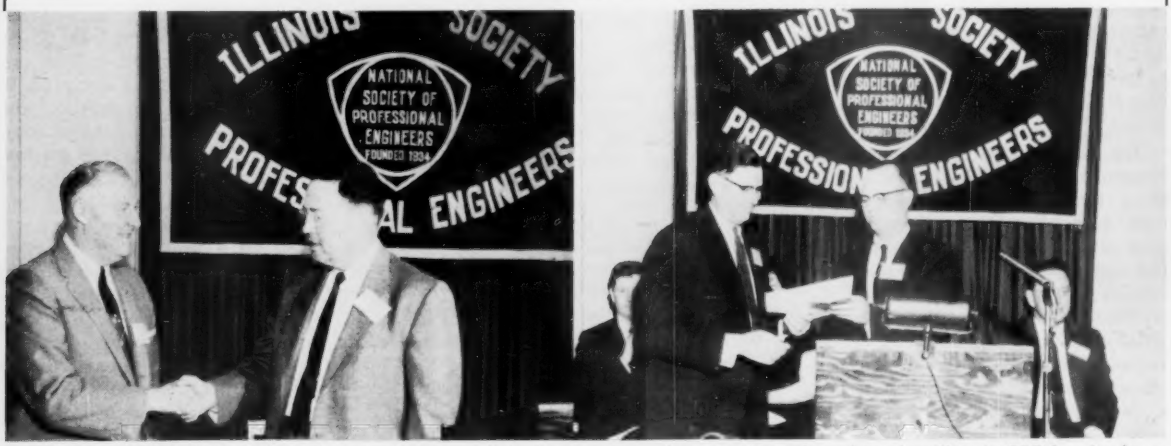
A. H. Kidder, Northeast Regional vice president of the National Society, told more than 250 engineers and engineering executives attending the annual meeting of the Massachusetts SPE held at Babson Institute of Business Administration, that the engineer carries with him a tremendous load of responsibility to himself and society as a whole.

Mr. Kidder said, "Registration alone does not make an engineer a professional, it only gives him a license to practice in proportion to his individual competence—a factor heavily weighted in favor of his personality, judgment, salesmanship and standing in his community."

Mr. Kidder pointed out that individual growth in professional stature depends heavily upon the engineer's individual ability to enlarge his characteristically objective point of view, by developing post graduate competence for dealing constructively with subjective considerations, particularly those of communication and mastery of his own personality traits, such as initiative, jealousy, selfishness, thoroughness, moodiness, cunning, open-mindedness and fear of criticism.

"The stature of our profession can be no more or less than the sum total of the contributions of each individual through his own effort, in his own community," he concluded. *(See photo at right.)*

### *Annual Meeting at Illinois*




Left photo: NSPE President Garvin H. Dyer, left, is shown as he was introduced to the Illinois SPE by Andrew W. Neureuther, retiring ISPE president, at the seventy-third annual meeting of the Illinois Society. Mr. Dyer also attended annual meetings in New Jersey, Pennsylvania, New York, and California recently. Right photo: J. D. Voorhees, right, presents a Certificate of Commendation to Dr. Ellis Danner of the Champaign County Chapter, ISPE, in recognition of his service to the Society and the engineering profession during the past year when he was president of the Illinois Highway Council.

### *Annual Massachusetts Meeting*

NSPE Vice President Allan H. Kidder, left, is shown at the annual meeting of the Massachusetts SPE with Alexander G. Korol, center, of MIT, and Dr. Gilbert C. Garland, director of admissions at Northeastern University.

### *Ohio Society Elects Baty As President*

At the conclusion of their eighth annual convention in Cleveland recently the Ohio Society installed the following new officers for 1958-59: H. Bruce Baty, Middletown, president; Homer T. Borton, Cleveland, Edward F. Simes, Cincinnati, and Wayne E. Ault, Youngstown, vice presidents; Wayne H. Kuhn, Marion, secretary, and George W. Brandt, Dayton, treasurer.

Theme of the convention was "The Seaway—Ohio's Route To Opportunity," and highlighted the importance of the St. Lawrence project to Ohio.

### *New Mexico Chapter Nominates Officers*

The Southeastern Chapter of the New Mexico Society of Professional Engineers held a dinner-business meeting at the Country Club in Artesia with twenty-two members present from Artesia, Alamogordo, Carlsbad, Lovington, Hobbs and Roswell.

Nominated for chapter officers for 1958 were L. O. Storm, Hobbs, president; E. G. Minton, Jr., Lovington, vice president, and Fred Allen, Roswell, secretary-treasurer. Harold Sauereissig was introduced as a successful politician and engineer as well. He was recently elected mayor of Artesia.

### *Suffolk County Chapter*

Franklin J. Johnson, president of the New York State SPE, and Harold H. Funk, NYSSPE executive director, were guest speakers at a recent meeting of the Suffolk County Chapter, NYSSPE. Shown, l. to r., are: Julius Schubert, chapter vice president; Leland C. Fitts, chapter vice president; Mr. Funk; Mr. Johnson; John B. Blydenburgh, chapter president, and Donald Chilton, chapter secretary.

## WITH THE *Auxiliaries*

By Mrs. Harry G. Kennedy, Chairman of the Ladies Auxiliary Advisory Committee.

ONE OF THE MAIN OBJECtives of an auxiliary is to assist in any way with a project of the chapter. Two South Carolina auxiliaries are doing big things with this objective. The Charleston Auxiliary sponsored a mathematical contest among area high school students. The student obtaining the highest test score received a fifteen dollar cash award and students with the highest rating at individual schools received pins. This was in conjunction with the Mathematical Association of America and NSPE.

THE PIEDMONT AUXILIARY (Greenville) has organized Junior Engineering Societies or "JETS" in five of the junior high schools. Each school provides a faculty advisor (a teacher in math or science), the Chapter provides the program for monthly meetings and the Auxiliary has a sponsor for each club. Next year they hope to expand to the senior high schools with similar clubs.

WE HAVE TWO NEW AUXILiaries to add to our list, Parkersburg Auxiliary to the Wood County Chapter of the West Virginia SPE was organized April 22 with forty-nine charter members. Mrs. R. C. Bundy was elected president. Mrs. John Martin, wife of the vice president of W. Va. SPE, presided at the organizational meeting. T. A. Frye represented the Chapter.

MRS. WALTER GRESS WAS elected president of the newly-organized auxiliary to the Westchester Chapter, Yonkers, N. Y.

IN THE FIRST YEAR OF ITS existence the Wives' Auxiliary to the Western Chapter (Kansas City area) of the Missouri Society has added twenty-seven new members for a total of ninty-five. Luncheon meetings followed by varied programs have been held each month.

*(Continued on page 37)*



PROFESSIONAL DIRECTORY Alphabetized by States . . .

Alphabetized by States . . .
Alabama-Michigan

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*Restricted to Registered Professional Engineers . . . Directory Continued on Next Page*

## AUXILIARIES

*(Continued from page 35)*

CENTRAL ILLINOIS AUXILIARY has increased its membership one hundred per cent this year. News from many other auxiliaries show plans for membership drives, installation of new officers, summer picnics and varied activities.

### *Lorain County Society Elects New Officers*

Oliver H. Jones, senior economist of The Federal Reserve Bank of Cleveland, addressed the Lorain County (Ohio) Society of Professional Engineers recently. He spoke on "The Working Tools of The Federal Reserve Bank and Their Effect on the Economy."

Election and installation of officers for the year 1958-59 was also held at the meeting last night with David Kerr, Lorain, being elected as president; H. S. Ezzard, Avon Lake, vice president; E. R. Ostrognai, Lorain, secretary; Dudley Flynn, Lorain, treasurer; D. E. Kropp, Elyria, alternate trustee, and John E. Gilkey, Elyria, past president, as trustee to the Ohio Society of Professional Engineers.

### *Official Visit*

Hugh Nelson, State president of the Pennsylvania SPE, paid an official visit during a recent meeting of the Crawford County Chapter of the Society. L. B. Utterback, regional vice chairman of the State Ethics and Practices Committee, spoke on chapter responsibility. Shown seated, l. to r., are: Mr. Nelson and Robert Perry, president of the County Chapter. Standing, l. to r., are: John Duerr, vice president of the County Chapter; Mr. Utterback; Glenn Shorts, State vice president, and Everett Warren, secretary-treasurer of the County Chapter.

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## *Dean Freund Talks To Toledo Society*

Prof. Clement J. Freund, dean of the College of Engineering, University of Detroit, addressed a well-attended meeting of the Toledo Society of Professional Engineers and the University of Toledo Student Chapter in March.

Dean Freund spoke about engineers and specifically about their deportment, appearance, and manners. He stressed the importance of good style in appearance and manners as the *key* to getting on in an engineering career. He assumed that the engineer is competent technically.

City Manager Russell Rink presented Dean Freund with a glass key to the city.

Following the speaker, a panel of eight professional engineers moderated by Elbert Leuty, chairman of the Educational and Young Engineers Committee, answered questions from the students.

### *Toledo Society Hears Educator*

Shown at a recent meeting of the Toledo Society are, l. to r.: William F. Rohr, program chairman; Dean Clement J. Freund, guest speaker; Dean Otto Zmeskal, College of Engineering, University of Toledo, and Russell Rink, Toledo city manager.

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(Continued from page 14)

The third and lowest in professional rank are engineers known as "Institutingenjorer," who have graduated from lower technical schools.

The requirement for admission to the technical universities is the matriculation examination, the "student examen" taken upon graduation from a gymnasium. The written part of the matriculation consists of tests in three subjects. Students who have taken the humanities course in the gymnasium are tested in Swedish, Latin, and French; those in the science course in Swedish, English and Mathematics. After passing the written tests, the student must next succeed in an oral examination given in four or five subjects. The average age of the Swedish student at the time of the matriculation examination is nineteen or twenty.

In principle, instruction is free; however, certain modest fees are paid for some courses, but they are an insignificant part of the cost of study. Several different kinds of study grants are available for Swedish students. The oldest state support, instituted in 1919, is an interest-free loan. Repayment is made two to three years after graduation. In 1946 another type of state loan was introduced, called an academicians' loan, permitting students who have been successful in their studies to consolidate their debts into one loan for which the state assumes the risk. This loan may be amortized during a period of ten to fifteen years after graduation. A third type of state loan permits students to obtain a study loan with the state as guarantor. These are interest-bearing but are larger in amount than the interest-free loan. In 1947 state scholarships were founded both for undergraduates and to help those who are working for a doctor's degree.

### Norway

Norway has only one technical university, that at Trondheim. Entrance requirements are matriculation from the science line of a secondary school, and for most departments one year of practical training in industry. As in Sweden, the course theoretically lasts four and a half years, but the average time required is about five years. As students usually do their military service before finally leaving the university, the average age of the graduate is 26.3 years.

Owing to lack of space, laboratories, equipment and teaching staff, admittance to the university is very restricted, and only about fifty per cent of the qualified applicants may be accepted. The student admitted must therefore meet a high standard of qualifications. The percentage of students leaving the university without graduation is small, about 5-8 per cent as compared with the fall-out rate in other countries.

THE government grants scholarships and interest-free loans for studies in Norway and abroad. Loans may be repaid in fifteen years. Repayments can be deducted from taxable income. For the year 1954/55, from sixty to seventy per cent of the students at the technical university received state loans.

Due to the very limited facilities available at the Technical University of Norway many Norwegian students go abroad for their technological training and have done so for decades. Traditionally, this has been considered as very valuable additional source of qualified personnel. Up to the last war the rate was about 10-20 per cent of the total supply of Norwegian engineers; since then it has increased. In recent years about the same number of qualified Norwegian engineers graduate from foreign universities as from the Technical University of Norway. In 1956, the Norwegian Parliament accepted a ten-year plan for the further expansion of the technical university. This will enlarge capacity to permit graduation of around 400 engineers and architects a year.

### Netherlands

The Netherlands has two technical universities, at Delft and at Eindhoven. The university at Eindhoven opened in the fall of 1957.

The regulations governing university studies are not identical for the different studies. Sometimes, after one or two years, a preliminary (propaedeutic) examination has to be taken. Generally, however, after about four years of study the "candidaatsexamen" (bachelor examination) has to be passed. As a rule study at the technical university is for a period of six to eight years. When completed, the course is comparable to a master's degree in the United States. The technical university at Delft, in addition to its technological curriculum, has a "studium generale" which provides lectures on religion, philosophy, music and art.

Another source of engineers is from the technical colleges which exist at the next lower educational level. For admission at least three years of secondary education is required. The training given by these institutions, which lasts from three to four years, is of a more practical nature than the studies at Delft or Eindhoven. The level attained by the students on leaving is claimed to be comparable to that of the bachelor degree in the United Kingdom and the United States. These technical colleges are set up by the municipalities and private institutions.

### Switzerland

Two university-level institutions exist in Switzerland for training of engineers: the Ecole Polytechnique at Lausanne and the Swiss Federal Institute of Technology at Zurich.

### Ecole Polytechnique

The Ecole Polytechnique, established in 1853, has been autonomous since 1946 although remaining within the general framework of the university. Students between eighteen and twenty enter from the gymnasium which is generally evaluated as equivalent to two years of junior college in the United States. The average study program for a diploma of engineering at the university level is four years. Graduates may continue to work for a doctor of science. The following courses are offered: geometry, engineer-chemist, engineer-physicist, mechanical engineer, civil engineer, mathematics.

Laboratories, which play an important role in the life of the school, are attached to the Ecole. Their objectives touch three closely inter-related fields, namely: teaching, scientific research, and research projects submitted by industry and public organizations.

### Swiss Federal Institute of Technology

The Swiss Federal Institute of Technology, founded in 1854, is the only technical university owned and administered by the Swiss Government.

SINCE its foundation, its aim has been to provide a scientific education combining basic scientific knowledge with practical training. Professors have the same standing and prestige as do university professors. They are free to deal with their subjects as they think best. The first two years are mainly devoted to the study of basic science, while the last two deal chiefly with practical applications and

specialized professional training. During the last two years, constant interaction develops between professors and students in lecture rooms, laboratories and field trips to industry. In addition, a general school offers courses in history, philology, philosophy, and economics which are open to all students of the Institute. They are given daily between five and seven p.m. during which hours no professional lectures are given. All students are required to take at least one course each term in the general school, a requirement which is exceptional in the higher education of engineers in Europe and Great Britain.

The number of full-time students varies from 3000 to 4000, coming from all parts of Switzerland and from numerous foreign countries. At least 20-25 per cent of regular students are residents outside Switzerland. To be admitted to the Swiss Federal Institute, applicants must be at least eighteen and have passed matriculation at a recognized preparatory college.

The Institute's eleven schools for professional education and one school for general subsidiary studies of a cultural and humanistic character are fairly independent of one another, but have standard courses of three to four years. Degree candidates are required to attend certain lectures and do certain prescribed work during the course. Graduates of the schools receive a diploma in engineering or science as the case may be. During the course, a degree candidate must pass three examinations, the first and second intermediate examinations at the beginning and end of the second year, and the final examination, partly oral, at the end of the course. A diploma thesis is also required. Lectures as supplemented by excursions to important industrial concerns and other places of professional interest both in Switzerland and abroad.

### Denmark

University engineers are trained at the technical university in Copenhagen, which is the only institution of its kind in Denmark.

The permanent staff of the technical university (professors and lecturers) are appointed by Royal Decree, nominations being submitted to the King by the Ministry of Education on the recommendation of the technical university. Other members of the staff are appointed either by the Ministry of Education on the recommendation of the university or by the rector of the university. The rector himself is appointed by Royal Decree for five years. He decides all matters which do not require the approval of the Ministry of Education or the staff assembly, the board of faculties or the faculty committees. The staff assembly is responsible for the normal curriculum of the technical university and for the award of scholarships and grants.

As the college is a state institution, the university fees are very low, 100 Kr. (a Kroner is equal to 15 cents) a year for part I of the program and 40 Kr. a year for part II. Although the state provides the funds necessary to run the laboratories, large foundations such as the Carlsberg, the Otto Monsted, the Laurits Anderson, the H. C. Orsted, the Tuborg, the Thomas B. Thrige, and several others, grant ample sums in support of research.

The normal length of study in preparation for part I of the civil engineers' examination is two years, and for part II two and a half years; a year's practical training must be added for mechanical and electrical engineers. According to university records, the average length of time required to graduate is:

| | |
|---|---|
| Chemical engineer | 4.69 years |
| Mechanical engineer | 6.15 years |
| Civil engineer | 5.38 years |
| Electrical engineer | 6.07 years |

In 1956 there were 680 applicants for admittance to the technical university but only 440 were accepted. There were also 165 applicants, of which 100 were accepted, for the new accelerated school program inaugurated in the summer of 1957 to permit mechanical engineers to attain a degree comparable to a bachelor's in four years, civil engineers in three and a half years, and electrical engineers in three years. A special postgraduate course of one to two years will be established leading to the normal university degree.

In 1955, there were 327 university-level graduates in applied science distributed as follows: civil engineering 111, chemical engineering 69, mechanical engineering 86, and electrical engineering 61.

### France

Engineers in France come from three principal sources: (a) the faculties of sciences of the universities, (b) graduation from the Ecole Polytechnique followed by graduation from a specialized school of engineering, and (c) graduation from schools of engineering attached to universities, established by certain industries or privately supported. The system for training engineers in France is different in many essentials from that in all other countries in Europe due to certain historical and cultural factors that will be explained.

MANY universities have schools of engineering as autonomous organizations. In general, candidates for admission must spend at least two years of preparation for the competitive examination required for admission. These engineering schools are specialized, for example the school of electricity at Nancy. In general the course requires three years. The courses in these schools are generally given by the professors of the university, except for highly specialized engineering subjects for which engineers from the industries involved are selected to teach.

Another route for becoming an engineer is through the Ecole Polytechnique which is under the jurisdiction of the Defense Department. This institution has been traditionally a central institution for training the best of French manpower from all of France in the many phases of science. Graduates are then assigned to the civil or military service of the state. Selection of students is by competitive examination. Graduation from the Ecole Polytechnique confers the right to a position in the civil service or as an officer in the military service. All tuition and subsistence expenses are paid by the state, which in addition gives a small salary to each student. After completion of the two-year program in basic sciences, graduates (who average about 200 in number) enter a specialized school of engineering for two years' additional training in a particular branch of engineering. Most of these are under a particular ministry. For example, the Ecole des Telecommunications is under the Ministry of Posts, Telegraph and Telephone. Upon completion of the specialized schools, graduates enter the particular ministry for which they were trained. They are expected to remain in the government service for ten years.

An additional group of engineering schools are those founded by industries, for example, the Ecole Superieure d'Electricite founded by electrical industry.

### Summary

Some current features of the place of the engineer in Great Britain and the countries of Western Europe are:

1. The educational level of the secondary school training (gymnasium or grammar school) for those students intending to enter a university is probably equivalent to the first two years of an undergraduate college program

in the U.S. Entrants to British and European universities are in the average one to three years older than those entering college in the United States.

2. An impetus is given to increase the supply of engineers by encouragement of professional engineering training among employees in government and industry and by officially providing the time and financial support. For example, in Great Britain the policy industry followed is releasing employees for one day or more a week to attend technical courses. The role of the technical colleges in Great Britain in developing engineers on a part-time basis through the "sandwich" and other types of program is also significant.

3. The availability of government-sponsored loans and scholarships in Norway, Sweden, France, and Great Britain, with favorable terms for the undergraduate, permits students from the lower income groups to attend a university.

4. Legal and official emphasis is placed upon accreditation and recognition of the professional engineer supported by the use in Europe of a prefix showing level of engineering education, and in Great Britain by the identification of the membership held in a professional institution.

5. An average of one year of practical training in industry is required prior to receiving a university level engineering diploma in most of the institutes of technology in Western Europe. In Great Britain two years of practical experience is necessary for acceptance as a member in the appropriate professional instititution for engineers.—**End.**

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## WERWATH

*(Continued from page 28)*

tion of qualified personnel by specifically identifying titles will result in less turnover and better personnel relations.

There is an urgent need for explanation to the community as a whole of the importance of scientific and engineering technicians to the nation. Until the community leaders understand the need for and the importance of diversified technical personnel on the scientific or engineering team, there will not be an adequate flow into the technical educational system of young men to satisfy the needs of industry and government.

Numerous government agencies reported inability to use properly scientific or engineering technicians because of lack of proper job classifications, with consequent low ceilings on positions offered. The Working Committee, therefore, recommended that the Civil Service Commission review job classifications to provide recognition of the education and the training of scientific or engineering technicians as higher education, and to provide adequate ceilings.

Recognition is not limited to the individual. Technical schools offering technical institute type of higher education, whether they be formal technical institutes, junior colleges, community colleges, or other institutions of higher learning where technical institute type of courses are offered, also need full regional recognition. The Working Committee found that such regional accrediting is important in the appointment of qualified teaching staffs and in seeking the qualified student.

2. Better Utilization of All Types of Technical Personnel

One of the best means of increasing the current supply of scientific and engineering technicians is to improve their utilization. The experience of World War II and the Korean conflict proved that intelligently planned manpower programs go far in stretching needed skills to meet specific shortages. Major consideration was given to the following seven points:

The need for understanding in industry and government of the role of the scientific and engineering technician. To this end, informational materials are being prepared to be released by government agencies, large organizations and unions for dissemination among executives, managers, scientists and engineers.

The promotion of teamwork between industry and the schools to set up more technical institute type courses in higher education, including cooperative training programs.

The development of flexible curricula through industrial collaboration which will reflect industrial changes quickly and accurately.

Training managers, supervisors, scientists and engineers to use to the optimum supporting technical personnel.

Setting up procedures for further education of scientific and engineering technicians, especially for such persons who have completed a formal two-year technical institute type course.

The encouragement of industry and government periodically to review job definitions and organizational structures in order to define accurately the work to be done by scientific and engineering technicians.

The revision of the *Dictionary of Occupational Titles* by defining new occupations in the technician area. There are some 600 not now listed. Definitions should be developed and published as an independent supplement to the dictionary listing and defining jobs which scientific and engineering technicians now do.

3. Greater Financial Assistance Needed

Many schools and students are now supported by industry and other sources. The Working Committee commends these programs; however, it is the Working Committee's unanimous opinion that more loans and scholarships are needed for scientific and engineering technicians, regardless of the educational institution involved. Industries, foundations, technical societies, and public agencies should give serious consideration to increasing their financial support to the technical institute type of higher education on an individual basis. The Committee believes the support should include grants for:

A. Grants-in-aid, and especially an extensive loan program on a private basis to qualified, mature students;

B. Capital expenditures to expand present buildings, equipment, and endowments for teaching.

4. Improving Teaching

The lack of qualified teachers, especially in the technical specialties, is one of the most crucial problems blocking the way toward increasing the number of scientific and engineering technicians. The Working Committee, realizing that teacher shortages and inadequacies are a problem at all levels of education, recommended the following:

a. Generous fellowships from private sources to keep qualified people in the teaching profession.

b. The development of endowments by industry and alumni and annual support for teacher salaries in technical schools.

c. The lending of scientists and engineers by industry to schools for part or full-time teaching assignments.

d. Establish a clearing house for teachers of science, engineering, mathematics, and related applied technical subjects in technical institute programs to supplement present public and private teacher placement agencies.

5. Financial Aid to Mature Students

Industry now supports many students who are taking courses in technical institutions, but more and larger funds for scholarships are needed.

Many students in technical institute type curricula are

in the 20-24 year age bracket. These students probably have had an extensive period of employment after high school, before enrolling in a technical school. In many cases, this also means that they either gave up a job to study, with all the incident hardships to themselves and family, or have a special arrangement to attend school while also working full or part-time. In either case, it is obvious that financial assistance would help these students by providing more of them the opportunity for full-time enrollment. It would also permit speedier completion of training and, therefore, a more rapid increase in the supply of qualified scientific and engineering technicians. All types of higher education should be considered in such a program, but technical institute type of higher education has been seriously neglected in the current scholarship program.

6. Annual National Statistics Needed

Accurate annual national statistical reports on technical institute enrollment and graduations are needed. For over a decade, an annual survey of full-time and part-time enrollment has been conducted by Dr. Leo F. Smith and published by the *Technical Education News*. The latest survey covers some seventy-one schools. As a result of the work of the Technical Institute Division of the American Society for Engineering Education, a broader view has now developed. Such statistics could be gathered and published by the U. S. Office of Education, in cooperation with ASEE, in much the same manner that engineering enrollments and graduate statistics are gathered and published by both.

7. Institute Specialists for U.S. Office of Education

The Working Committee agrees that a specialist in the technical institute type of higher education should be on the staff of the U. S. Office of Education. Technical education has been greatly advanced by the services rendered by the chief for engineering education in the U. S. Office of Education, Dr. Henry H. Armsby. An assistant assigned to the area of technical institutes would help to develop vitally needed basic services.

8. Unity of Institutes Necessary

The rapid growth of the technical institute type of higher education requires a closer coordination among the member schools than now exists. Close cooperation is necessary to provide technical institute programs of higher education with professional services on such common problems as local, state, and national legislation, and public relations.

9. Foundation Members Need Additional Revenue Sources

Since the independent, privately endowed technical schools are not associated with organizations representing general higher education which engage in mutual fund raising, they have organized the Technical Institute Foundation. Included are technical schools in major industrial centers—Boston, Philadelphia, Cincinnati, Milwaukee, and San Francisco. These non-tax supported schools are facing special problems in financing their fast-growing plants and staffs in the face of smaller percentages of total income from endowments. Their collective problems need broad sympathy and help from the nation's industries, especially those large firms which employ a high proportion of the graduates.

10. A Plan for Supplementing Technically Trained Manpower Sources

The importance of a growing corps of well prepared scientific and engineering technicians in the interest of our national defense is axiomatic. The Technical Institute Division of ASEE has repeatedly called for the development of a "reserve technical training corps," much like the ROTC in colleges and universities, to help man our increasingly complicated machines for defense.

11. Upgrading in Industry

Over one-half of the students in recognized technical institute type curricula are already employed in industry part-time, some on a formal cooperative basis. There is a growing interest within industry in programs for upgrading personnel because of the need for basic higher education and training of the technical institute type and this educational service should be greatly expanded for the effective development of technical supervisory personnel.

12. Aid of Technical Societies to Technicians

Scientific and engineering technicians act as liaison between scientists and engineers and other members of the working force. In some instances, they may have responsibility for supervision of production and craft employees. In fulfilling such supervisory duties, these technicians are part of the management team. As engineering personnel, they need help from the technical societies for technical and professional growth. Each such society can best determine the kind and the scope of such assistance. The natural, close personal relationships developed between the professional and the technical man in solving common problems will set up the basic framework within which the eventual pattern of cooperation between scientific and engineering technicians and technical societies will evolve.

Since the Committee was instructed to enlist the aid of interested individuals and groups to help carry out its recommended objectives, a follow-through program has been maintained. Two task forces were established as separate committees of The President's Committee to carry out specific objectives recommended by the Working Committee. One, the Task Force on Utilization of Scientists and Engineers, chaired by Dr. Maynard M. Boring, had as one of its major objectives the rounding out and distribution of literature in the field. This Task Force prepared and published two pamphlets:

A. *About to Choose Your High School Courses?* written for junior high school students.

B. *ANSWER/Your Engineering Manpower Problems*, written for industrial executives.

These publications supplement two other pamphlets: *Your Opportunities in Industry*, by the National Association of Manufacturers, and *The Engineering Technician*, by the Technical Institute Division of the American Society for Engineering Education. These four provide a rounded set of pamphlets on the engineering technician for junior high school students, senior high school students, guidance personnel and employers of technical personnel.

The Technical Institute Curricula Task Force, under the chairmanship of Donald E. Irwin, is under the general sponsorship of the Relations with Industry Division and the Technical Institute Division of the American Society for Engineering Education. The Task Force consists of six nominees from the Relations with Industry Division and three from the Technical Institute Division. It is engaged in an extensive study of technical institute curricula.

More than a score of specific, individual actions, many involving more than one of the recommendations, have been initiated and are currently in progress. Twenty-two of these were recorded in the Working Committee's Final Report submitted to The President's Committee on June 30, 1957. The Second Interim Report to The President's Committee of October 4, 1957, summarizes some of these as follows:

"The work on the utilization of technicians was carried forward by a special Task Force on Utilization of Scientific and Engineering Technicians, set up in August, 1956, under the chairmanship of Dr. Maynard M. Boring, at the suggestion of the original Working Committee which com-

*(Continued on page 46)*

# . . . NEW LITERATURE . . .

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**ASSEMBLIES**—Eastman's 32-page Technical Bulletin No. 200 on High Pressure Hose and Tube Assemblies offers a new approach in helping purchasing agents and design engineers meet specifications for increasingly higher pressure requirements. Nine major sections of this bulletin are devoted to couplings suited to all types of hydraulic applications—including Bent Tube Assemblies and Automotive Power and Air Conditioning Assemblies. Modern typography and arrangement of tables—directly opposite dimensional cross-section drawings — makes it easy to find and specify proper assemblies for every application. Complete up-to-date list of distributors is given. Write Eastman Mfg. Co., Manitowoc, Wis., for Technical Bulletin No. 200.

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**BELTING**—Hamilton Rubber Manufacturing Corporation has issued a 2-color, dual purpose, 16-page Conveyor Belting "Check-Up" Brochure. This brochure is designed as a complete information-and-record source for choosing, inspecting and ordering the proper type of conveyor belting. Information pertaining to each type of belting is arranged so that the reader can quickly locate the type of belt needed by material conveyed, determine whether the proper belting is now being used, check it for serviceability, and write in essential details for efficient reordering of replacements. For the convenience of operators faced with the problem or ordering belting for a new application, a complete worksheet is included, along with detailed information describing the many types of conveyor belts Hamilton makes. Copies of the Check-Up Brochure can be obtained without cost by writing to Adv. Dept., Hamilton Rubber Manufacturing Corporation, Trenton 3, N. J.

—AE—

**DRAFTING**—A drafting machine that can be used with the drawing board at any angle with complete freedom from special machine adjustments or the necessity of attaching counterweight mechanisms is described in a new 4-page bulletin just issued by the manufacturer. Complete use of drawing surface, instant and accurate finger-tip control, 360-degrees protractor with automatic 15-degrees settings, Vernier settings to 5 minutes are a few features. The bulletin also gives complete specifications. Copies may be had by writing direct to the company, Glideline Corporation, 300 South Potomac St., Waynesboro, Pa. Request Bulletin G58.

**EMERI-TOPCRETE**—How the ingredients of Emeri-Topcrete make a durable surface-hardened floor is explained in a 4-page, 2-color bulletin now available from Walter Maguire Co., Inc., New York, N. Y. The bulletin includes information on materials' resistance to abrasion and the gradation of the size of aggregates. An estimating table shows how much type SH is required to surface harden areas from 100 square feet up. It also indicates how many bags of cement should be used in each case. A list of major industrial users is included. Photographs show actual Emeri-Topcrete installations and the step-by-step procedure on how to lay a surface-hardened concrete floor is explained. Cost factors are also discussed. For copies of Bulletin SH 56, write to Walter Maguire Co., Inc., 60 E. 42nd St., New York, N. Y.

—AE—

**CASE STUDY**—A new case history bulletin describing how a metal-working plant was able to "automate" its materials handling techniques, while at the same time gaining 4500 square feet of floor space, is available from Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass. Designated as Case History Bulletin 349-1, the 4-page, 2-color presentation is fully illustrated with a series of in-plant photos. The bulletin takes the reader throughout the plant from receiving to production and finally to shipping. For a copy of the bulletin, write Lewis-Shepard Products, Inc., Dept. R8-10, 125 Walnut St., Watertown 72, Mass.

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**ALIDADES**—A 36-page, pocket-size service booklet on the use and adjustment of alidades has been published by W. & L. E. Gurley, Troy, N. Y. The revised edition of Service Booklet "C" includes tables by which the fieldman can obtain horizontal distances and elevations from stadia readings. The illustrated booklet also includes helpful information for use of the alidade in both exploration and map-making, as well as detailed instructions on stadia surveying and use of the Beaman Stadia Arc. Other subjects covered are: Alidade Adjustment, sections on Parallax, Striding Level, Cross-Level Rectification, Collimation, Control Level, Gradienter, Circular Level, Compass Needle, Finder Sights, and Beaman Stadia Arc Index. Copies of the booklet may be obtained by writing: Alidade Department, W. & L. E. Gurley, Troy, N. Y.

**CLINCH NUTS**—An 18-page illustrated handbook, Design Manual 5803, completely reviewing available standard and miniature types of clinch nuts for the avionic, electronic and electrical equipment industries, has been prepared by the Electric Stop Nut Corporation of America. Major features of the manual include a visual-descriptive index of all clinch nut types; a guide to selection of the correct fastener type to the job requirement; installation "tips" for best results in production; suggestions for installation tools and their effective use. Thirteen pages are devoted to detailed standard drawings covering each part and giving thread size, availability, temperature range and part dimensions. Copies of Design Manual 5803 are available from Department C, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, N. J.

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**PLASTICS**—Case histories of how Formica laminated plastics are used for electrical insulation are described in a new booklet, published by Formica Corp., subsidiary of American Cyanamid. "It's an Electrical World" shows, through words and pictures, how standard and special Formica materials have been used by a wide range of manufacturers. It was prepared to acquaint people in the electrical and electronics industries with Formica's many uses, according to E. A. More, Formica advertising manager. Copies of the booklet can be obtained by writing Formica Corporation, 4575 Spring Grove Avenue, Cincinnati 32, Ohio.

—AE—

**AIR PHOTOS**—How air photo interpretation provides essential soils and geologic data for engineering projects is reported in a new 4-page folder published by Aero Service Corporation. Soils can be mapped for their engineering properties, according to Aero engineers and geologists. They say soil texture, plasticity, internal and external drainage can be determined by experienced photo-interpreters. The folder also discusses the use of air photo studies to locate construction materials, determine trouble areas, aid route location, and to investigate excavation and foundation problems. Several examples of air photo interpretation are shown. Copies of the folder, "Air Photo Interpretation of Soils and Geology for Engineering Projects" are available on request from Aero Service Corporation, 210 E. Courtland St., Philadelphia 20, Pa.

***These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims.***

## WERWATH

*(Continued from page 44)*

pleted its work in January, 1957. Members of this Task Force and of the Committee staff met with key officials of large corporations to discuss the need for training, better utilization, and recognition of technicians. Existing programs in major firms have been publicized as potential models for new programs in other plants. Service clubs and professional organizations have also been encouraged to schedule speakers to disseminate information on a local basis.

"To provide a clearer basis for the employment of technicians in industry, the National Science Foundation, at the request of the President's Committee, made a grant to the Department of Labor, out of funds earmarked for the Committee, to finance the preparation of a supplement to the *Directory of Occupational Titles* which will contain uniform and objective descriptions of some 600 jobs performed by scientific and engineering technicians. This codification should go a long way towards assisting educational institutions and industry in identifying and delineating the work of the technician with salutary effects on their training, utilization and their status. Uniform job descriptions will also minimize the wastage of acquired skills resulting from transfers from one company or industry to another.

"With the encouragement of the President's Committee, the Bureau of Labor Statistics has undertaken, with a grant from the Veterans Administration, a revision of its counseling pamphlet on technicians. Also, at the suggestion of the President's Committee, the Department of Health, Education and Welfare has appointed a specialist on technical institute education, on a part-time basis, in the Office of Education.

"At the request of the President's Committee all but one of the regional accrediting associations have agreed to review the status of privately endowed technical institutes and to determine what steps, if any, are necessary to entitle them to some form of official recognition. The Committee has appointed a Task Force on Technical Institute Curricula, particularly with a view to fitting the training of technicians more closely to the needs of industry, and several national organizations of technical schools have been encouraged to coordinate their programs. To help alleviate the teacher shortage, arrangements have been made with the U. S. Employment Service to assist in recruiting teachers for technical institutes and technical divisions of universities and colleges. The teacher problem has been discussed with the National Science Foundation which, among other things, has agreed to invite technical school teachers to certain future 'institutes' sponsored by the Foundation."

In addition, the Census Bureau has agreed to cooperate by including data on scientific and engineering technicians in the forthcoming decennial census and the U. S. Office of Education is gathering annual enrollment and graduate statistics for a new release of such data. The American Society for Engineering Education General Council has approved the inclusion of statistics of enrollments and graduates of accredited curricula on an individual basis, and of non-accredited curricula on a group basis in the *ASEE Journal*.

Closer liaison has been established with the military and with technical and professional societies for consideration of the special problems of technical institute type of higher education and the status of graduates within their framework.

Most recently, in response to the suggestion of the development of unity organization, a Coordinating Committee on Scientific and Engineering Technicians, composed of designated officers of groups interested in technical institute education, has met and prepared a basic policy statement which was subsequently approved by the administrators of over 300 institutions offering two-year organized occupational curricula. The basic policy adopted reads:

"The technological team in the United States includes three basic types of technical personnel: The scientist and engineer; the scientific and engineering technician; and the craftsman. This policy concerns primarily the scientific and engineering technician.

"The demand for scientific and engineering technicians is more severe than the demand for scientists and engineers. An improvement in quality and an increase in the number of scientific and engineering technicians are among the most direct methods of improving the effectiveness of our scientific and engineering efforts.

"In facing the critical problems of today and those of our developing technological economy, three basic principles are recognized by all authorities regarding scientific and engineering technicians:

"1) To be most effective, the education of these technicians must be closely related to science and engineering rather than to vocational trade training.

"2) This education should be provided by institutions of higher learning through full-time, two-year organized occupational curricula generally leading to an Associate Degree.

"3) Foundation, private and/or government assistance to higher education should include assistance to institutions qualified to provide the education of scientific and engineering technicians."

On the basis of this statement, testimony for government committees has been prepared and presented in the interest of better understanding of technical institute type of higher education as an increasingly important part of the total program of higher education in the United States.

The follow-up work continues with the aid of the organizations represented on The President's Committee, professional engineers, engineering educators, and citizens, especially the industrialists, all of whom recognize that in the enhancement of this type of education lies a constructive element for the better utilization of our scientists and engineers and hence in the best interests of our technological advance in the nation.—**End.**

### *About the Author . . .*

Mr. Werwath

Karl O. Werwath has been the president of the Milwaukee School of Engineering since 1948. He was born on March 1, 1909, in Milwaukee and received his education there. He obtained his engineering degree in 1936 at the school of which he is now president.

Mr. Werwath's accomplishments in engineering as well as in public service are many. He became assistant registrar, registrar, vice president, and then president of his alma mater. Active in civic and professional organizations, he has been an officer of the ASEE since 1949. He has also served as an officer for both the Milwaukee and United States Junior Chambers of Commerce.

In the 1956-57 period, he served as chairman of the Working Group on Supporting Technical Personnel of The President's Committee on Scientists and Engineers, Washington, D. C. He is a member of NSPE's Committee on Engineering Technicians and serves on the Public Relations Committee.

## LETTERS

*(Continued from page 5)*

tain institutions was successfully curbed by the forceful combination of persons with the earned doctor of philosophy degree, the outstanding pedagogic periodicals, professional societies, and the U. S. Bureau of Education (see S. E. Epler's "Honorary Degrees," American Council of Public Affairs, 1943, p. 194).

Mr. Lazzari undoubtedly had in mind an honorary doctorate in engineering or in science, Eng.D. or Sc.D.

William A. Hamor, P. E.
Senior Director of Research,
Mellon Institute,
Pittsburgh, Pa.

### *Coover Plus One! . . .*

Dear Editor:

I have read many letters discussing the "Unity Plan" but had not found an acceptable basis for merger until Mr. H. William Mitchell's letter appeared in the April issue.

If we settle for anything less than the four point foundation outlined in Mr. Mitchell's letter we certainly will have hindered rather than helped our status.

May I suggest the four points mentioned be published in a future issue of AMERICAN ENGINEER and letters invited discussing this plan?

Let's go ahead with "Coover Plus One!"

James M. Purdy, P. E.
Austin, Texas

### *Turbett Piece . . .*

Dear Editor:

(Reference is made to the article) "When Are P.E.s in Industry Acting Unethically?" appearing in the April, 1958, issue of AMERICAN ENGINEER.

Mr. Turbett's article is one of the most interesting and challenging we have read in a long time. . . .

Michael Flagg, Editor,
*California Safety News*,
San Francisco, Calif.

### *More on Turbett . . .*

Dear Editor:

I have just finished reading "When are P.E.s in Industry Acting Unethically?" My congratulations to Frank J. Turbett, P.E., for his direct approach to some very vital points that determine professional concepts for the engineer in industry. If the AMERICAN ENGINEER can get a few more engineers employed in industry to contribute their thinking to this question, even to the point where it becomes controversial, I am sure it will be of great help to the employer, the public, and the profession.

A good approach could be made by attacking a few of the seven questions posed by the author and referred to as "day to day problems." The interest it might stimulate among engineers in industry may also suggest other specific areas for the application of ethical concepts to the largest segment of NSPE membership.

A. G. Behling, P. E.
Milwaukee, Wis.


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## *Corporation Violates Registration Statute In Arkansas*

A decision of the Arkansas Supreme Court, although dealing with the corporate practice of architecture rather than engineering, is significant for its holding that a corporation engaged in the business of construction and alteration of bank buildings had violated the State architectural registration law.

The corporation contracted with banks to furnish plans and specifications and for supervision of construction work. It maintained an architectural department as an integral part of its business with a staff of about two hundred persons. The only person on the architectural staff licensed by the State as an architect was the head of the staff, who worked for the corporation as a full-time employee and who detailed planning, inspection and supervision work to his unlicensed subordinates.

The case arose when the Arkansas State Board of Architects brought suit against the corporation claiming that under the circumstances the corporation was engaged in the practice of architecture under its contracts with customers without a license, and was therefore acting in violation of the Arkansas statute.

The corporation contended that all it was doing was designating a qualified architect to perform architectural services, namely, the head of its architectural staff who was licensed, and that this arrangement is permitted under the Arkansas statute. The Court held, however, that the corporation was doing far more than a mere designation. "It contracts with the owner to furnish plans and specifications (and it has a staff of two hundred employees in its architectural section to draw these plans); and then it provides the supervision of the construction. In short, the Building Corporation is agreeing to have its own employees do the architectural work."

The Court compared the existing situation to an earlier case which held that if a bank should furnish the services of attorneys to its customers, the bank would be engaging in the practice of law. "By the same token, the Building Corporation, by furnishing the services of architects to its customers, is engaging in the practice of architecture." *(Arkansas State Board of Architects v. Bank Building & Equipment Corp.*, 286 S.W. 2d 323.)


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# STRICTLY BUSINESS

***Personalities . . .*** **Alexander N. Shealy** has been appointed head of the Electrical Engineering Branch of **Kaiser Aluminum & Chemical Corporation's** Department of Metallurgical Research, Spokane, Wash. . . . **Col. Bennett H. Griffin,** recently retired as director, Washington National Airport, Washington, D. C., has become associated with **Howard Needles, Tammen and Bergendoff,** Consulting Engineers, as special aviation consultant. He will make his headquarters in the firm's office at the Miami International Airport, Miami, Fla. . . .

Mr. Shealy

**Dane Enterprises, Inc.** announces the appointment of **Allen A. Sylvane** as vice president and chief engineer of **Continental Electronics,** the Electronic Division of the firm in Brooklyn, N. Y. . . . **Orville W. Taylor** has been assigned senior engineer of the Henry (Ill.) General Chemicals Plant of **B. F. Goodrich Chemical Company** . . . **Buck Mickel** has been named vice president and assistant general manager of **Daniel Construction Company,** Greenville, S. C. . . . **Earle S. MacPherson,** who has served as a vice president of **Ford Motor Company** advising on engineering policy for the past year, retired from active participation in company affairs on May 1 . . . **Andrew H. Sawyer** has been named district sales manager of the Pittsburgh office for the Machinery and Systems Division of **Carrier Corporation.**

**Raymond S. Hoffman** has been elected to the board of directors of **Walter Kidde Engineers Southwest, Inc.,** according to an announcement by **Walter Collins,** president of **Walter Kidde Constructors, Inc.,** of New York and Houston . . .

Mr. Hoffman

The appointment of **James F. Young** as general manager of the **General Electric Company's** General Engineering Laboratory has been announced by **Clarence H. Liner,** vice president of engineering . . . **Zurn Industries, Inc.,** Erie, Pa., has announced the appointment of **Robert H. Shenk** as vice president and technical director of the firm's over-all operations, including its Research and Development Division . . . **Alexander H. Kuhnel** has been named manager of **The Austin Company's** Special Devices Division, with headquarters at the New York Port Authority building . . . The appointment of **Harold W. Murphy** to **The Trane Company's** Applications Engineering Department has been announced . . . **Kenneth M. Lord** has been appointed director of engineering in the Electronics Division of **Stromberg Carlson,** a division of **General Dynamics Corporation** . . . **Jack Mott** has been named assistant general manager of **Wright Engineering Company,** Pasadena, Calif. . . . The firm of **Seelye Stevenson Value & Knecht,** Consulting Engineers, New York, N. Y., announces the admission to partnership of **William D. Bailey.**

The appointment of **Frank L. Spencer** as assistant manager of engineering program development for **Waste King Corporation's** Technical Products Division, Los Angeles, Calif., has been announced . . . **Nicholas A. Liberatore** has been named president of **Raymond Concrete Pile Company of the Americas,** an overseas subsidiary company of **Raymond International, Inc.,** it has been announced . . . **Intrusion-Prepakt, Incorporated,** announces the appointment of **John C. King** as manager of sales, with headquarters in the Cleveland executive offices . . . **Joseph Philippi** has been named application engineer of the new Application Engineering Department within the Aeronautical and Instrument Division of **Robertshaw-Fulton Controls Company,** Anaheim, Calif. . . . **John T. Bailey** has been appointed chief design engineer of **Vitro Engineering Company,** New York, N. Y., a division of **Vitro Corporation of America** . . . **Robert P. Owens** has joined the staff of **Radar and Associates,** Engineers and Architects, Miami, Fla. . . . **Charles C. Silva, Jr.,** has been appointed director of process engineering at **Clevite Transistor Products,** Waltham, Mass., a division of **Clevite Corporation** . . . **James O. Starkweather** has joined the Industrial Engineering Department of **Ebasco Services Incorporated** as a paper mill engineer . . . **Edward W. Thorson** has been appointed regional manager of the **Portland Cement Association's** new regional office in Denver, Colo.

Mr. King

***New Firms . . .*** A consulting engineering firm has been chartered in Washington, Pa., known as the **I. and C. Engineering Corporation. Gustav Steuber** is president . . . **Thomas M. Lowe, Jr.,** announces the opening of **Thomas M. Lowe, Jr. & Associates, Inc.,** a civil and photogrammetric engineering firm in Atlanta, Ga. . . . Announcement has been made of the consulting engineering firm of **Collings-Vranich and Associates, Inc.,** Milwaukee, Wis. **William T. Collings** and **Emil F. Vranich** are the principals of the firm.

***Partnership . . .*** **Isadore Director** and **Ira L. Meyer** have announced the formation of the partnership of **Director & Meyer,** Engineers-Consultants, Philadelphia, Pa.

***Moved . . .*** **C. E. Jacob,** groundwater consultant, has moved his office from Utah to the Los Angeles area (Northridge, Calif.).

***Appointed . . .*** **M. L. X. Kambhu,** director general of the Royal Irrigation Department of Thailand, has appointed the firms of **Sverdrup & Parcel International, Inc.,** and **Engineering Consultants, Inc.,** as consultants for the $100 million Yanhee Hydroelectric Project in central Thailand. The primary purpose of the project is to produce power for use in the main population centers of Bangkok and Thonburi and in thirty-three government provinces of central and northern Thailand.

Chapter

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# *What's New*

**This column describes new products of general interest to professional engineers. For further information, circle the item number on opposite page and mail to the AMERICAN ENGINEER.**

***These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.***

## DUCT LINER — Item 30

An exceptionally lightweight, efficient glass fiber duct liner for insulating and quieting air conditioning and heating ducts has been developed. Known as Therma-K duct liner, it is designed for applications where temperatures range from sub-zero to 350 F. The duct liner offers low air resistance, making it ideal for all heating or cooling ducts, it is claimed.

## REFLECTIVE PAINT — Item 31

The development of Plasticool NB for application to asphaltic surfaces and Plasticool GR for application to gravel-coated built-up roofs has been announced. Known as the "air-conditioned paint," it reflects virtually all of the heat rays from the sun and has proven to be a very economical way of cooling many types of industrial, commercial and residence structures, according to the manufacturer.

## SOILS APPARATUS — Item 32

A compact soils load settlement device has been announced. Consolidation tests are performed in the lab to determine a soils load settlement characteristics with time. The data obtained from tests on a small sample can be used to predict the settlement of a foundation under a building, dam, bridge, chimney, etc.

## RESURFACING MATERIAL — Item 33

A floor repair and resurfacing material, which can be applied without interrupting traffic or production, has been developed. Known as Nacor Minit-Set, it is a plastic compression type material that sets up instantly and will immediately withstand 50,000 lb. loads. It contains no asphalt or gravel and is not a mastic. The manufacturer advises that the material comes ready-mixed and ready to use.

## TIE CLASP — Item 34

Crafted in a beautiful golden colored finish, this miniature reproduction of the T-Square is fashioned into an attractive piece of jewelry. It is claimed that every minute detail of this tie clip is a careful imitation of the T-Square right down to five simulated tiny screw heads. Perfectly balanced in over-all design, it complements both narrow or wide style ties.

## VERTICAL FILE — Item 35

Plan Hold Corp. announces a new vertical file for *single* large sheets such as blueprints, drawings, plans, maps. Each sheet is filed individually. It hangs flat and free from wrinkles or creases, ready for instant identification and use. The file consists of a wall mounted bracket that accommodates up to 150 aluminum hangers.

## DRAFTING FILM — Item 36

A new drafting medium—Duracene Tracing Film—that may replace conventional materials, including cloth, has been introduced. So strong as to be virtually indestructible, this new film cannot be torn; it is permanent and will not discolor, split, or crack from age or heat, and its uniformly high transparency produces clearer reproductions in a shorter time than other drafting media can, the manufacturer claims.

## TRIPLE-ANGLE — Item 37

Alvin & Co., Inc., has designed a serviceable "Triple-Angle" triangle which utilizes the functions of three triangles, 45°/90° and 30°/60° angles and built-in slot lettering guides for 1/8", 1/4", 3/16" and 3/8" lettering for layouts, sketching, or planning wherever limited equipment is required.

## BINDER FINDER — Item 38

A handy measuring device in ruler form has been designed by American Photocopy Equipment Co. to determine the proper size plastic binding to bind together reports, manuals, etc., with its "APECO Bindak" punching and binding units. The flexible plastic gadget features slots from ¼ to 1⅛ inches for measuring the ring diameter size for stacks of papers to be bound. Available free to plastic binding users.

## WONDER WATCH — Item 39

The Wakmann Watch Co., Inc., announces the wonder watch with the exclusive built-in circular slide rule. Designated as The Chronomat, this combination chronograph and slide rule can be utilized in an infinite number of ways. It features an all-steel case, 17-jewel movement, 60 second, and 45 minute registers.

# American Engineer

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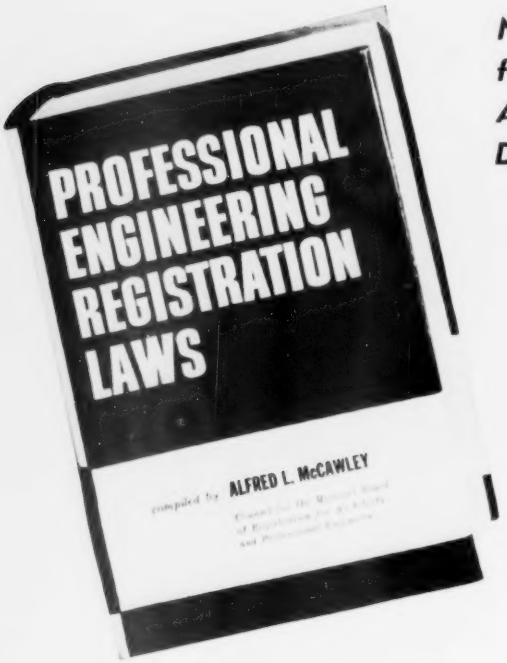


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### The Author

Alfred L. McCawley, a Missouri State Senator for many years, is the author of numerous published articles on professional registration for engineers and architects. A sponsor of the Missouri securities law, he is counsel for that State's Board of Registration for Architects and Professional Engineers. His legal career dates back to 1900, when he was admitted to the Missouri Bar.

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